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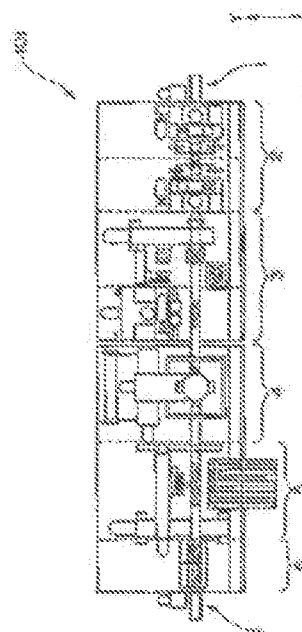
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(54) 【発明の名称】 テープ状基板への電子部品の実装方法及び実装装置

(57) 【要約】

【課題】 電子部品を基板に実装する際に、実装装置の各作業部における基板の搬入・搬出ロス時間が少なく、さらに実装装置をできる限り小さくすることが可能な電子部品の実装方法及びその実装装置及びそれを使用するテープ状基板を提供する。

【解決手段】 複数の回路パターンが連続して形成されているテープ状基板を用い、上記テープ状基板を間欠的に送り、上記間欠的な送りの停止時に上記テープ状基板に複数の電子部品の実装を行うことにより、基板送りの時間ロスを無くし、さらに、従来の実装装置の作業部部に設けていた基板のバッファ部を不要とできることから、実装装置サイズを小さくする。



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【特許請求の範囲】

【請求項1】 複数の電子部品(31、51)を実装可能な回路パターン(12)が一定間隔(P)に複数連続して形成されているテープ状基板(11)を断欠的に送り、上記テープ状基板(11)の断欠的な送り停止時に、上記テープ状基板(11)の上記回路パターン(12)上に上記電子部品(31、51)の実装を行うことを特徴とするテープ状基板への電子部品の実装方法。

【請求項2】 複数の電子部品(31、51)がICチップ(31)とチップ部品(51)であり、上記ICチップ(31)と上記チップ部品(51)の各接合部(13、14)を有する回路パターン(12)が複数連続して形成されたテープ状基板(11)を断欠的に送り、上記ICチップ(31)を上記テープ状基板(11)に実装するためのICチップ実装用前作業をし、上記ICチップ実装用前作業が施された上記テープ状基板(11)に上記ICチップ(31)を実装し、上記ICチップ(31)が実装された上記テープ状基板(11)に上記チップ部品(51)を実装するためのチップ部品実装用前作業をし、上記チップ部品実装用前作業が施されて半田(44)が供給された上記テープ状基板(11)に上記チップ部品(51)を実装し、上記チップ部品(51)が実装された上記テープ状基板(11)の半田(44)をリフローするとともに、上記テープ状基板(11)の断欠的な送り停止時に、上記ICチップ(31)を上記テープ状基板(11)に実装するための実装作業工程から上記チップ部品(51)が実装された上記テープ状基板(11)の半田(44)をリフローする作業工程までの異なる上記実装作業工程において、上記テープ状基板(11)の異なる上記回路パターン(12)上に、同時に上記実装作業工程の作業を行う請求項1に記載のテープ状基板への電子部品の実装方法。

【請求項3】 上記ICチップ実装用前作業が施された上記テープ状基板(11)に上記ICチップ(31)を実装する作業工程において、上記ICチップ(31)の複数の電極(31a)にパンプ(31b)が形成された上記ICチップ(31)を、上記ICチップ(31)の上記各パンプ(31b)が上記テープ状基板(11)の上記回路パターン(12)上の複数の電極(13a)と接合可能なように位置合わせし、上記ICチップ(31)の各パンプ(31b)を上記テープ状基板(11)の各回路パターン(12)上の各電極(13a)と接合し、上記ICチップ(31)を上記テープ状基板(11)に実装する請求項2に記載のテープ状基板への電子部品の実装方法。

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【請求項4】 上記ICチップ(31)を上記テープ状基板(11)に実装するための上記ICチップ実装用前作業を施す作業工程において、

上記ICチップ(31)の複数の電極(31a)にパンプ(31b)が形成された上記ICチップ(31)を、上記ICチップ(31)の上記各パンプ(31b)と上記テープ状基板(11)の上記回路パターン(12)上の各電極(13a)とを接合可能な接合材料(21、25)として、導電性の樹脂シート(21)、または樹脂ペースト(25)を上記テープ状基板(11)の各回路パターン(12)上に供給し、

上記ICチップ実装用前作業が施された上記テープ状基板(11)に上記ICチップ(31)を実装する作業工程において、

上記テープ状基板(11)の上記回路パターン(12)上に供給された上記接合材料(21、25)である上記導電性の樹脂シート(21)、または樹脂ペースト(25)を介して、上記ICチップ(31)を実装し、

上記樹脂シート(21)、または上記樹脂ペースト(25)を加熱しながら加圧し、

上記ICチップ(31)の上記各パンプ(31b)を上記テープ状基板(11)の上記回路パターン(12)上の上記各電極(13a)と導電的に接合し、上記樹脂シート(21)、または上記樹脂ペースト(25)が熱硬化することにより接合を維持する請求項2に記載のテープ状基板への電子部品の実装方法。

【請求項5】 上記ICチップ(31)を上記テープ状基板(11)に実装するための上記ICチップ実装用前作業を施す作業工程において、

上記ICチップ(31)の複数の電極(31a)にパンプ(31b)が形成された上記ICチップ(31)を、上記ICチップ(31)の上記各パンプ(31b)と上記テープ状基板(11)の上記回路パターン(12)上の各電極(13a)とを接合可能な接合材料(21、25)として、導電性粒子(21a)が分布された樹脂シート若しくは樹脂ペースト、または導電性の樹脂シート若しくは樹脂ペーストを上記テープ状基板(11)の各回路パターン(12)上に供給し、

上記ICチップ実装用前作業が施された上記テープ状基板(11)に上記ICチップ(31)を実装する作業工程において、

上記テープ状基板(11)の上記回路パターン(12)上に供給された接合材料(21)である上記導電性粒子(21a)が分布された上記樹脂シート若しくは上記樹脂ペースト、または上記導電性の樹脂シート若しくは樹脂ペーストを介して、上記ICチップ(31)を実装し、

上記樹脂シート、または上記樹脂ペーストを加熱しながら加圧し、

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上記ICチップ(31)の上記各パンプ(31b)を上記テープ状基板(11)の上記各回路パターン(12)上の上記各電極(13a)に上記導電性粒子(21a)、または上記導電性の樹脂シート若しくは樹脂ペーストを介して間接的に接合し、上記樹脂シート、または上記樹脂ペーストが熱硬化することにより接合を維持する請求項2に記載のテープ状基板への電子部品の実装方法。

【請求項6】 上記ICチップ(31)を上記テープ状基板(11)に実装するための上記ICチップ実装用前作業を施す作業工程において、

上記ICチップ(31)の複数の電極(31a)にパンプ(31b)が形成された上記ICチップ(31)を、上記ICチップ(31)の上記各パンプ(31b)と上記テープ状基板(11)の上記各回路パターン(12)上の各電極(13a)を接合可能な接合材料(21、25)として、導電性材料である金属をテープ状基板(11)の各回路パターン(12)上に供給し、

上記ICチップ実装前作業が施された上記テープ状基板(11)に上記ICチップ(31)を実装する作業工程において、

上記テープ状基板(11)の上記各回路パターン(12)上に供給された接合材料(21)である上記金属を介して、上記ICチップ(31)を実装し、上記金属を加熱溶融し、

上記ICチップ(31)の上記各パンプ(31b)を上記テープ状基板(11)の上記各回路パターン(12)上の上記各電極(13a)に上記金属を介して間接的に接合し、

上記金属が熱硬化することにより接合を維持する請求項2に記載のテープ状基板への電子部品の実装方法。

【請求項7】 複数の電子部品(31、51)がICチップ(31)とチップ部品(51)であり、上記ICチップ(31)と上記チップ部品(51)の各接合部(13、14)を有する回路パターン(12)が複数連続して形成されたテープ状基板(11)を間欠的に送り、

上記ICチップ(31)の複数の電極(31a)が、上記テープ状基板(11)の上記各回路パターン(12)上の複数の電極(13a)に接合可能なように位置合わせし、上記ICチップ(31)の各電極(31a)をト

上記チップ部品(51)が実装された上記(11)の半田(44)をリフローする上記テープ状基板(11)の間欠的な送り、上記テープ状基板(11)に上記ICチップ実装する作業工程から上記チップ部品(51)または上記テープ状基板(11)の半田(44)する作業工程までの異なる上記各作業工程、上記テープ状基板(11)の異なる上記回路パターン(12)上に、同時に上記各作業工程、請求項1に記載のテープ状基板への電子部品

【請求項8】 複数の電子部品(31、51)がICチップ(31)とチップ部品(51)であり、上記ICチップ(31)と上記チップ部品(51)の各接合部(13、14)を有する回路パターン(12)で形成されたテープ状基板(11)を間欠的に送り、上記ICチップ(31)を上記テープ状基板(11)に上記ICチップ実装用前作業を施されたテープ状基板(11)に上記ICチップ(31)を上記ICチップ(31)が実装された上記(11)に上記チップ部品(51)を実装する作業工程を施し、

上記チップ部品実装用前作業が施された上記テープ状基板(11)の複数の電極(51a)が、上記テープ状基板(11)の上記各回路パターン(12)上の複数の電極(14a)に接合可能なように位置合わせし、上記チップ部品(51)の上記各電極(51a)を上記テープ状基板(11)の上記各回路パターン(12)上の複数の電極(14a)に上記接合材料(44)を介して接合し、上記ICチップ(31)が実装されたテープ状基板(11)に上記チップ部品(51)を実装する作業工程を施し、

上記テープ状基板(11)の間欠的な送り、上記テープ状基板(11)に上記ICチップ実装する作業工程から上記ICチップ実装された上記テープ状基板(11)に、上記チップ部品(51)を実装する作業工程までの異なる上記各作業工程において、上記テープ状基板(11)の異なる上記回路パターン(12)上に、同時に上記

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上記チップ部品(51)の上記各電極(51a)を上記テープ状基板(11)の上記各回路パターン(12)上の基電極(14a)に上記導電性樹脂を介して間接的に接合し、

上記導電性樹脂が熱硬化することにより接合を維持する請求項8に記載のテープ状基板への電子部品の実装方法。

【請求項16】 上記接合材料(44)が金属であり、上記チップ部品(51)の上記各電極(51a)を上記テープ状基板(11)の上記各回路パターン(12)上の複数の電極(14a)に接合可能なように位置合わせし、

上記チップ部品(51)の上記各電極(51a)を上記テープ状基板(11)の上記各回路パターン(12)上の基電極(14a)に上記金属を介して実装し、

上記金属を加熱溶融し、上記チップ部品(51)の上記各電極(51a)を上記テープ状基板(11)の上記各回路パターン(12)上の複数の電極(14a)に上記金属を介して間接的に接合し、

上記金属が熱硬化することにより接合を維持する実装する請求項8に記載のテープ状基板への電子部品の実装方法。

【請求項11】 複数の電子部品(31、51)を実装可能な回路パターン(12)が一定間隔(P)に連続して形成されているテープ状基板(11)を間欠的に送ることが可能なテープ状基板供給作業部(1)と、

上記テープ状基板供給作業部(1)による上記テープ状基板(11)の間欠的な送りの停止時に上記テープ状基板(11)の上記各回路パターン(12)上に上記各電子部品(31、51)の実装が可能な電子部品実装作業部(2、3、4、5、6)と、

上記各電子部品(31、51)が実装された上記テープ状基板(11)を間欠的に巻き取ることが可能なテープ状基板巻取作業部(7)を備え、

かつ、上記テープ状基板供給作業部(1)と上記テープ状基板巻取作業部(7)は、同時に上記テープ状基板(11)の供給および巻き取り作業を行うことが可能であることを特徴とするテープ状基板への電子部品実装装置。

【請求項12】 複数の電子部品(31、51)がIC

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装された上記テープ状基板(11)を間欠することが可能なテープ状基板巻取作業部(上記電子部品実装作業部(2、3、4、上記ICチップ(31)を上記テープ状基板(11)に上記ICチップ実装用前作業可能なICチップ実装前作業部(2)と、上記ICチップ実装用前作業が施された板(11)に上記ICチップ(31)をICチップ実装作業部(3)と、

上記ICチップ(31)が実装された上記(11)に上記チップ部品(51)を実装するテープ状基板巻取前作業部(4)と、

上記チップ部品実装用前作業が施されて供給された上記テープ状基板(11)に、(51)を実装可能なチップ部品実装作業部(5)に上記チップ部品(51)が実装された上記(11)の半田(44)をリフローするリフロー作業部(6)を備え、

上記テープ状基板供給作業部(1)による上記テープ状基板(11)の間欠的な送りの停止時に、実装前作業部(2)から上記チップ部品(31)までの異なる上記各作業部(2、3、4、5、6)は、上記テープ状基板(11)の回路パターン(12)上に同時に上記各作業部(4、5、6)の作業を行うことが可能で、上記テープ状基板供給作業部(1)と上記巻取作業部(7)は、同時に上記テープの供給作業および巻き取り作業を行うこと請求項11に記載のテープ状基板の電子部品実装装置。

【請求項13】 上記テープ状基板(11)に巻き付け可能なもので、上記テープ状基板供給部(1)は、上記に巻き付けられた上記テープ状基板(11)を巻き戻すことにより間欠的に供給可能なリール供給部(1a)を備え、

上記テープ状基板巻取作業部(7)は、上記(31、51)が実装された上記テープを上記リール(71)に巻き取ることに、上記テープ状基板供給部(7a)

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は、上記テープ状基板(11)に実装された上記電子部品(31、51)を保護可能な凹凸部を有するシート状のエンボス状スペーサ(73)で保護された上記テープ状基板(11)を、上記リール(71)に巻き取ることにより断欠的に巻き取ることが可能なテープ収納部(7a)を備える請求項13に記載のテープ状基板への電子部品実装装置。

【請求項16】 上記チップ部品リフロー作業部(6)と上記テープ状基板巻取作業部(7)の間に、上記チップ部品リフロー作業部(6)において加熱された上記テープ状基板(11)を冷却可能な冷却部をさらに備える請求項12に記載のテープ状基板への電子部品実装装置。

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【発明の属する技術分野】本発明は、複数の回路パターンが連続して形成されたテープ状基板上の上記各回路パターンに複数の電子部品の実装を行うテープ状基板への電子部品実装方法及び実装装置及びそれに使用されるテープ状基板に関する。

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【従来の技術】従来、ＩＣチップおよびチップ部品等の電子部品の基盤への実装は、個片の基盤を一定数積ずつまとめて、実装装置内の作業工程に送り、その後、各工程における所定の作業位置に個片の基盤を１枚ずつベルトコンベア等により送り、接合材料の供給、および電子部品の実装、および接合材料の加熱・加圧等により、電子部品の基盤と基盤の裏面の導通接合を行っていた。

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【発明が解決しようとする課題】しかしながら、上記構造のものでは、実装装置内の各工程における作業時間の違いによる基板送りの時間ロスを少なくするために、実装装置内の各作業工程毎に基板のバッファ部を設け、各工程において処理された基板を各バッファ部に送り、各バッファ部において一定数量単位の基板が溜まった後、一定数量単位でまとめて処理された基板を次の作業工程へ送っているため、装置サイズが大きくなるという問題があった。また、装置内の各作業工程において、一定数量単位の全ての基板が所定の処理が施され、排出され、次の工程に一定数量単位まとめて基板を送る



装置サイズを小さくすることが可能なテ
ラ干部品実装方法および実装装置および
れるテープ状部材を提供することにある。
【0005】

【問題を解決するための手段】上記目的に、本発明は以下のように構成する。

【０００６】本発明の第１態様によれば、品を実装可能な回路パターンが一定間隔形成されているテープ状基板を間欠的に、ブ状基板の間欠的な送り停止時に、上記上記回路パターン上に上記各電子部品とを特徴とするテープ状基板への電子部提供する。

【0607】本発明の第2態様によれば、品がICチップとチップ部品であり、上記ICチップ部品の各接合部を有する回路、連続して形成されたテープ状基板を間欠ICチップを上記テープ状基板に実装する作業を繰り返し、上記ICチップが実装された上記テープ状基板に上記ICチップが実装された上記テープ状基板を実装するためのチップ部を繰り返し、上記チップ部品実装前作業が供給された上記テープ状基板に上記チップ部品が実装された上記テープ状基板をリフローするとともに、上記テープ状基板の送り停止時に、上記ICチップを上記テープ状基板に実装するための前作業工程から上記チップ部品が実装された上記テープ状基板の半田をリフローする工程において、上記の異なる上記基作業工程において、上記の異なる上記基回路パターン上に、同時に上記の作業を行う第1態様に記載のテープ状基板の実装方法を提供する。

【0008】本発明の第3態様によれば、半導体素子製造工程において、上記チップを実装する作業工程において、上記複数の電極にパンプが形成された上記「上記」チップの上記各パンプが上記特定の回路パターン上の複数の電極に接合可能に接合せし、上記「上記」チップの各パンプを

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フ状基板の各回路パターン上に供給し、上記ICチップ
 実装前作業が施された上記テープ状基板に上記ICチッ
 プを実装する作業工程において、上記テープ状基板の上
 記各回路パターン上に供給された上記接合材料である上
 記導電性の樹脂シート、または樹脂ペーストを介し
 て、上記ICチップを実装し、上記樹脂シート、または
 上記樹脂ペーストを加熱しながら加圧し、上記ICチッ
 プの上記各パンプを上記テープ状基板の上記各回路パ
 ターン上の上記各電極に直接的に接合し、上記樹脂シー
 ト、または上記樹脂ペーストが熱硬化することにより接
 合を維持する第2態様に記載のテープ状基板への電子部
 品の実装方法を提供する。

【0010】本発明の第5態様によれば、上記ICチッ
 プを上記テープ状基板に実装するための上記ICチップ
 実装前作業を施す作業工程において、上記ICチップ
 の複数の電極にパンプが形成された上記ICチップを、
 上記ICチップの上記各パンプと上記テープ状基板の上
 記各回路パターン上の各電極を接合可能な接合材料とし
 て、導電性粒子が分布された樹脂シート若しくは樹脂ペ
 ースト、または導電性の樹脂シート若しくは樹脂ペ
 ーストをテープ状基板の各回路パターン上に供給し、上記
 ICチップ実装前作業が施された上記テープ状基板に上記
 ICチップを実装する作業工程において、上記テープ状
 基板の上記各回路パターン上に供給された接合材料であ
 る上記導電性粒子が分布された上記樹脂シート若しくは
 上記樹脂ペースト、または上記導電性の樹脂シート若し
 くは樹脂ペーストを介して、上記ICチップを実装し、
 上記樹脂シート、または上記樹脂ペーストを加熱しなが
 ら加圧し、上記ICチップの上記各パンプを上記テープ
 状基板の上記各回路パターン上の上記各電極に上記導電
 性粒子、または上記導電性の樹脂シート若しくは樹脂ペ
 ーストを介して間接的に接合し、上記樹脂シート、また
 は上記樹脂ペーストが熱硬化することにより接合を維持
 する第2態様に記載のテープ状基板への電子部品の実装
 方法を提供する。

【0011】本発明の第6態様によれば、上記ICチッ
 プを上記テープ状基板に実装するための上記ICチップ
 実装前作業を施す作業工程において、上記ICチップ
 の複数の電極にパンプが形成された上記ICチップを、
 上記ICチップの上記各パンプと上記テープ状基板の上

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2態様に記載のテープ状基板への電子部品
 提供する。

【0012】本発明の第7態様によれば、
 品がICチップとチップ部品であり、上
 上記チップ部品の各接合部を有する回路
 連続して形成されたテープ状基板を間欠
 ICチップの複数の電極が、上記テープ
 回路パターン上の複数の電極に接合可能
 わせし、上記ICチップの各電極を上記
 上記各回路パターン上の各電極に超音波
 接合を施し、上記テープ状基板に上記IC
 し、上記ICチップが実装された上記テ
 記チップ部品を実装するためのチップ部
 品を施し、上記チップ部品実装前作業が
 供給された上記テープ状基板に上記チッ
 し、上記チップ部品が実装された上記テ
 図をリフローするとともに、上記テープ
 なり停止時に、上記テープ状基板に上
 実装する作業工程から上記チップ部品が
 テープ状基板の半田をリフローする作業
 上記各作業工程において、上記テープ
 上記各回路パターン上に、同時に上記
 業を行う第1態様に記載のテープ状基板
 実装方法を提供する。

【0013】本発明の第8態様によれば、
 品がICチップとチップ部品であり、上
 上記チップ部品の各接合部を有する回路
 連続して形成されたテープ状基板を間欠
 ICチップを上記テープ状基板に実装す
 ュップ実装前作業を施し、上記ICチッ
 が施された上記テープ状基板に上記IC
 し、上記ICチップが実装された上記テ
 記チップ部品を実装するためのチップ部
 品を施し、上記チップ部品実装前作業が
 料が供給された上記テープ状基板に上記
 数の電極を上記テープ状基板の上記各回
 複数の電極に接合可能なように位置合
 プ部品の上記各電極を上記テープ状基板
 ターン上の各電極に上記接合材料を介し
 ICチップが実装された上記テープ状基

【0017】本発明の第12態様によれば、複数の電子部品がICチップとチップ部品であり、上記ICチップと上記チップ部品の各接合部を有する回路パターンが複数連続して形成されたテープ状基板を間欠的に送ることが可能なテープ状基板供給作業部と、上記ICチップと上記チップ部品を上記テープ状基板の上記各回路パターンに実装可能な電子部品実装作業部と、上記ICチップ

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【0021】本発明の第10態様によれば、
解読リフロー作業者と上記チーム作業者

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向に細長い電子部品実装装置101は、上面に電子部品、例えばICチップおよびチップ部品をテープ状基板に実装するための複数の作業部を互いに隣接し合いながらテープ状基板の送り方向であるX方向に沿って有している。これらの作業部は大きく分けて7つの各作業部により構成されており、テープ状基板供給作業部1、ICチップ実装前作業部2、ICチップ実装作業部3、チップ部品実装前作業部4、チップ部品実装作業部5、チップ部品リフロー作業部6、およびテープ状基板巻取作業部7により構成されている。

【0024】テープ状基板供給作業部1において、絶縁性基体により形成されている1本のテープ上に互いに独立した複数の回路パターンが一定間隔をもって連続するように形成されたテープ状基板が巻かれているリールからテープ状基板を巻出し、ICチップ実装前作業部2にテープ状基板が供給される。

【0025】次に、ICチップ実装前作業部2において、テープ状基板の各回路パターン上のICチップ接合部に、ICチップをテープ状基板に接合するための接合材料を供給し、その後、ICチップ実装作業部3において、ICチップを熱圧着により、テープ状基板に接合材料を介して接合させる。

【0026】次に、チップ部品実装前作業部4において、テープ状基板上のチップ部品接合部に、チップ部品をテープ状基板に接合するための半田を供給し、チップ部品実装作業部5において、半田を介してチップ部品をテープ状基板に取り付け、チップ部品リフロー作業部6において、加熱を行い、テープ状基板上に供給されている半田を溶融し、チップ部品をテープ状基板に接合させ、その後、エアブロー等により加熱されたテープ状基板を冷却する。

【0027】最後に、テープ状基板巻取作業部7において、各回路パターンにICチップおよびチップ部品が実装されたテープ状基板をリールに巻き取る。

【0028】また、テープ状基板は、ICチップ実装前作業部2からチップ部品リフロー作業部6までの各作業部において、各ステージ上に吸着固定された後、各所定の作業が施され、全ての作業部においてテープ状基板の各ステージ上への吸着固定が解除された後、テープ状基板は各所定の作業が施された各作業部から次の各作業

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り構成される電子部品実装装置101を、基板への電子部品の実装方法について、説明する。

【0031】図4に示すように、ICチップ部品の実装が可能な同一回路パターン間のピッチPをもって連続するようにテープ上に形成されている。ここでピッチPと同一回路パターン12と連続する次の同一回路パターン12との間の各回路パターン12中の同じ位置のテープ状基板11の長さ方向の間隔を示す。図4に示すように、テープ状基板11が巻き付けられているリール15、供給作業部1におけるリール供給部1a、テープ状基板巻戻用モーター16を用いて、テープ状基板11を巻き戻させることにより、テープ状基板11より巻戻しながら、次の作業部である供給前作業部2へテープ状基板11を間欠的な巻戻させることにより、テープ状基板11の作業が行われる。

【0032】次に、テープ状基板11の同一回路パターン12がテープ状基板供給作業部から図2に示すように供給前作業部2まで送られた後、供給前作業部2において、各回路パターン12のテープ状基板11が、ステージ20の吸着穴21によりステージ20に吸着保持される。

【0033】次に、図5(a)に示すように、複数の回路パターン12の導体材料でテープとテープ状基板11における各回路パターン12のICチップ接合部13の複数の導体13aの非導電性の樹脂材料である接合材料21をリール23aにより片面が保護されたシート22により片面が剥離された状態で供給されており、シート22の片面が剥離され、さらに、図5(b)に示すように、テープ状基板11の各回路パターン12のICチップ接合部13へ供給可能なように、切り、切断面21aで薄片が切断された後、テープ状基板11の各回路パターン12のトコヘ

の接合材料２１の張り付けに代えて、テープ状基板１１における各回路パターン１２のＩＣチップ接合部１３へダイスボンダ２６により導電供給される。

【0035】次に、テープ状基板11の各回路パターン12がICチップ実装前作業部2から図2(a)のICチップ実装作業部3における第1の作業部であるICチップマウント作業部3aまで送られた後、ICチップマウント作業部3aにおいて、接合材料21が貼り付けられた回路パターン12を有するテープ状基板11が、ステージ30aの吸着穴で吸引されることによりステージ30aに吸着保持される。

【0036】次に、図6(a)に示すように、ICチップ31の上面の露出の電極31aに導電材料であるAuによりバンプ31bが形成されている。図2(a)において、ICチップ31は部品トレイ32内に整列配列されており、反転部33に内蔵のY方向移動用モーター33aにより反転部33は部品トレイ32の上方に移動し、反転部33の吸着ノズルによりICチップ31を吸着保持しながら部品トレイ32より取り出し、反転部33はICチップ31を吸着保持したまま元の位置へ戻る。

【0037】次に、ICチップ31の基板上31bが形成された面が下向きとなるように、反転部33の反転用モーター33bでICチップ31を反転した後、反転部33に内蔵のX方向移動用モーター33cにより反転部33はICチップ31を吸着保持したままワール34の下方に移動し、図6(b)に示すように、ICチップ31はワール34の下面の加圧・加熱部に吸着保持され受け渡される。

【0038】その後、反転部33はツール34の下方から元の位置に戻ると共に、ICチップ31はツール34に吸着保持されたまま、ツール34のY方向移動用モーター34aによりテーブル状基板11上に移動され、ICチップ31の各パンプ31bとテーブル状基板11における各回路パターン12のIC接合部13の各電極13aが接合可能なように、ICチップ31をテーブル状基板11における各回路パターン12に対して位置合わせした後、図6(c)および(d)に示すように、ツール34により加熱しながら加圧され、ICチップ31がテーブル状基板11における各回路パターン12のICチップ接

Abstract

【0040】次に、図7(a)に示すように、基板11上に供給された接合材料21に、Cチップ31を本圧着するための加熱・加圧面である下面を保護シーティング層41で被覆し、加熱・加圧時の汚れから防止されており、常に清潔に保たれている。

【0041】加熱・加圧ツール35のX-
 ークター35a、35bにより、テープ状
 20 熱・加圧ツール35は移動され、図7
 に、テープ状基板11上に供給された接
 圧着されたICチップ31の上面が、加
 35で加熱されながら加圧されることに
 31の各パンプ31bとテープ状基板
 ターン12のICチップ接合部13の高
 にある接合材料21が押し退けられ、1
 各パンプ31bは、テープ状基板11に
 ターン12のICチップ接合部13の高
 接的に接合される。その後、接合材料2
 29 ICチップ31とテープ状基板11の接
 こととなる。その後、加熱・加圧ツール
 に戻され、テープ状基板11のステー
 は解除される。

【0042】ここで、接合材料21には、脂材料に代えて、導電性粒子を含む樹脂・導電性の樹脂材料、または導電性材料であってもよく、例えば、図7(d)に示すように1が導電性粒子21aを含む異方性導電性糊は、テープ状基板11上に供給された接圧されたICチップ31の上面が加圧され、ICチップ31の各パンプ31bと12のICチップ接合部13の各電極14に接合材料21が加圧され、接合材料21における導電性粒子21aを介して、ICチップ31bとテープ状基板11の基面11aのICチップ接合部13の基電極13aとが導通される。

【0043】また、ICチップ31の組
 ーブ状基板11における基回路(ター
 ンブ集合部13)の各無極13aは、上記の

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ープ状基板11が、ステージ42の吸着穴42aで吸引されることによりステージ42に吸着保持される。

【0045】次に、メタルマスク43をテープ状基板11上に下降させ、テープ状基板11における各回路パターン12の複数のチップ部品接合部14の各電極14a上にプレート状のメタルマスク43の複数の半田供給用開口部43aを、各半田供給用開口部43aから各チップ部品接合部14の各電極14a上にクリーム半田44の供給が可能のように位置合わせし、メタルマスク43をテープ状基板11上に設置する。

【0046】次に、スキージ45の先端をXY方向移動用モーター45a、45bによりメタルマスク43の上面に当て、滑らせると共に移動させることにより、クリーム半田44を各半田供給用開口部43aに充填し、テープ状基板11における各回路パターン12のチップ部品接合部14の電極14a上にクリーム半田44を印刷供給する。その後、テープ状基板11上のメタルマスク43を上方に移動させ、ステージ42の吸着を解除する。

【0047】ここで、クリーム半田44のテープ状基板11における各回路パターン12の複数のチップ部品接合部14の各電極14aへの供給は、図示はしないが、メタルマスク43およびスキージ45に代えて、ディスペンサを用いることにより塗布供給してもよい。

【0048】また、クリーム半田44は、接合材料44の一例であり、接合材料44をクリーム半田44に代えて、鉛を含まない半田や、AuとSnの合金等の金属、又は導電性の樹脂であってもよい。

【0049】次に、テープ状基板11の各回路パターン12がチップ部品実装前作業部4から図3のチップ部品実装作業部5まで送られた後、チップ部品実装作業部5において、図9に示すように、クリーム半田44が印刷された各回路パターン12を有するテープ状基板11が、ステージ6の吸着穴55aで吸引されることによりステージ56に吸着保持される。

【0050】次に、図3において、複数の電極51aを有する複数のチップ部品51が収められているカートリッジ52に、ヘッド53のXY方向移動用モーター53a、53bによりヘッド53をXY方向に移動させ、ヘッド53の吸着ノズル54にてチップ部品51を吸着

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12がチップ部品実装作業部5から図3のフロー作業部6まで送られた後、チップ部品実装部6において、図10に示すように、1が実装されたテープ状基板11が、ステージ6の吸着穴55aで吸引されることによりステージ6に吸着保持される。

【0052】次に、各チップ部品51がテープ状基板11における各回路パターン12の接合部14の各電極14aに印刷された14を、光ビームやヒーター等の熱源61し、冷却して固化させることにより、各電極51aとテープ状基板11における12の各チップ部品接合部14の各電極14aとを接続する。その後、テープ状基板11のステージ6の吸着を解除される。

【0053】この時、既に、テープ状基板11の各回路パターン12上に実装されている12に熱源61からの熱が当たり、ICチップ1の接合品質を低下させないために、パターン12上に接合されているICチップ1を覆うことが可能のように形成された樹脂チップ31の上面全体を覆い、ICチップ1の熱より遮蔽することもある。

【0054】さらに、熱源61により加熱されたテープ状基板11が放熱しにくいように、ステージ6におけるテープ状基板11との間に空層として設けている。

【0055】また、チップ部品リフロー加熱されたテープ状基板11および実装部品51をエアブロー等により冷却することによるテープ状基板11等の歪みを少なくする。

【0056】最後に、テープ状基板11の12がチップ部品リフロー作業部6からテープ状基板巻取作業部7まで送られた後、テープ状基板巻取作業部7において、エアブロー等によりテープ状基板11を、ICチップ31および12が実装された状態で、テープ状基板巻取部7を用いてテープ状基板7aに取り付けられ、巻き回されることにより、リール7

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【0058】なお、チップ部品51の実装にあたっては、上記における半田のリフローによる実装方法に代えて、ICチップ31の実装方法と同様に、導電性樹脂や金属を接合材料として用い、加熱および加圧を施すことにより、実装してもよい。

【0059】また、テープ状基板巻取作業部7において、ICチップ31及びチップ部品51が実装された状態で、テープ状基板11をリール71に巻き取ることに代えて、ICチップ31及びチップ部品51が実装された状態で、テープ状基板11における各回路パターン12をテープ状基板11から打ち抜き、個別に打ち抜かれた各回路パターン12を各回路基板としてトレイ等に取り出す場合であってもよい。

【0060】次に、上記各作業部における一連の各作業を行うための実装装置101の制御系統について説明する。図12は、実装装置101の制御系統図である。実装装置メイン制御部によりテープ状基板巻取用モーター16および巻取用モーター72は動作制御されている。さらに、ICチップ実装前作業部2からチップ部品リフロー作業部6までの各作業部は、各作業部毎にサブ制御部を有しており、これらの各サブ制御部により各作業部内の各モーター等の非制御部は動作制御されている。さらに、これらの各サブ制御部は全てメイン制御部からも集中的に監視制御可能なように関連付けられている。

【0061】また、実装装置メイン制御部において、テープ状基板11の送りが動作制御されており、ICチップ実装前作業部2からチップ部品リフロー作業部6までの各作業部において、テープ状基板11の各回路パターン12に当該作業部での各所定の作業が施され、上記各作業部においてテープ状基板11の各ステージ上への吸着固定が解除されると、各サブ制御部よりメイン制御部へ各作業部の解除信号が送られ、メイン制御部が全ての上記作業部における各解除信号を各サブ制御部より受け取る。その後、テープ状基板巻取用モーター16および巻取用モーター72に対し回転動作信号がメイン制御部より送られ、テープ状基板巻取用モーター16および巻取用モーター72が回転することにより、テープ状基板11上の各回路パターン12はピッチPでもって送られることとなる。よって、各作業部においては、テープ状基板11が吸着固定され、テープ状基板11上の1つの

となり、メイン制御部にてテープ状基板待機状態とさせ、必要に応じてメイン制御部等が発することもある。

【0063】また、各作業部において、基板11上に連続して形成された各回路パターン12の各部品実装位置を正確に認識する必要がある。パターン12の各部品実装位置を正確に認識する回路パターン12の部分的な形状を形状を認識することにより、各部品の実装位置を認識する各作業部に有している。

【0064】さらに、テープ状基板11の回路パターン12中に不良回路パターンが含まれる場合は、テープ状基板11における各回路パターン12のデータに基づき、その不良回路部においてスキップさせることが可能。

【0065】また、ICチップ実装前作業部2からチップ部品リフロー作業部6までの間において、テープ状基板11の各回路パターン12のデータに基づき、その不良回路部においてスキップさせることが可能。

【0066】次に、テープ状基板11を処理する際において、テープ状基板11の停止時間1について説明する。ICチップ実装前作業部2からチップ部品リフロー作業部6、における各作業に要する時間を、ICチップ実装前作業部2が1、ICチップ実装前作業部3が2、ICチップ実装前作業部4が3、ICチップ実装前作業部5が4、チップ部品実装前作業部6が5、とする。すると、テープ状基板11の停止時間1は、各作業部における時間1、2、3、4、5の最大値1、2、3、4、5、により決定される。

【0067】また、ICチップ実装前作業部2からチップ部品リフロー作業部6においては、ICチップ部品51を各回路パターン12に加熱時間が必要となるため、ICチップ部品51又はチップ部品リフロー作業部6における時間1、2、3、4、5、が、各作業部に

工程を2分割等に分割化することにより、当該作業部における当該作業に要する時間も同様に分割され、小さくなることとなり、作業工程分割後の各作業部における各作業に要する時間 t_1, \dots, t_n の最大値 t_{max} は、作業工程が分割された後の当該作業部における作業に要する時間も含め、各作業部における各作業に要する時間の内の最大となる作業時間となる。従って、最大値 t_{max} は最大値 t_{max} より小さくすることができ、テープ状基板11の間欠的な送りの停止時間1を短縮化することができる。

【0068】また、種子部品実装装置101は、ICチップ実装前作業部2からチップ部品リフロー作業部6までの各作業部の順に搭載され、ICチップ31が実装された後にチップ部品51を実装しているが、チップ部品51が実装された後にICチップ31を実装するように各作業部を構成してもよい。

【００６９】なお、本実施形態においては、同一回路パターン１２が一定の間隔ピッチＰをもって連続して形成されているテープ状基板１１への電子部品の実装方法について説明したが、テープ状基板１１に回路パターン１２が一定の間隔ピッチＰをもって連続して形成されているれば、各回路パターン１２が同一でなく、多少違っていてもよい。

【0070】上記第1の実施形態によれば、以下の様な効果を得ることが出来る。

【００７１】従来、実装装置内の各作業部毎に、基板のパッファ部を設け、各作業部において処理された基板を各パッファ部に送り、各パッファ部において一定数量単位の基板が溜まった後、一定数量単位でまとめて処理された基板を次の作業部へ送っていた。しかし、同一回路パターン１２が一定間隔のピッチＰをもって連続するように形成されたテープ状基板１１を用い、実装装置１０１の各作業部にこのテープ状基板１１を供給し、各作業部においてテープ状基板１１に所定の作業を施し、作業が施されたテープ状基板１１を巻き取り、かつこのテープ状基板１１の供給作業および巻き取り作業を同期させ、間欠的に行うことにより、テープ状基板１１の供給から巻き取りまでの間の互いに輪流する各作業部においては１本のテープ状基板１１が通され、かつテープ状基板１１が間欠的に送られることとなる。

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【0073】また、実装装置に基板送り、な場合における従来の電子部品の実装組立装置内での作業部において、一定数、基板が電子部品の実装作業を施された後、排出され、次の作業部に一定数量単位まで、次の作業部においては、蓄積となっており、基板送りの時間ロスが、し、同一の回路パターン12が連続する、なチップ状基板11を用い、実装装置1、チップ状基板11を供給し、1つの回路パターンの作業部で所定の作業が施される毎に、作業パターン12はピッチPでもって次の作れる。それと共に、各作業部においては当該業が施されていない回路パターン12が、となる。従って、各作業部においては、し、基板にそれぞれの所定の作業を施す、板送りの時間ロスを短縮することができ、削減を図ることが可能となる。さらに、て稼働率を上げることができ、生産性を、となる。

【0074】また、従来の個片の基板11の実装方法においては、個片の基板を各当該作業部での所定の作業を施し、基板11を排出し、これらの作業を繰り返して行なう作業部において個片の基板の送り位置とが困難であった。しかし、テープ状基板パターン12が、一定の間隔ピッチPを有するように形成されることにより、各回路バツメ、テープ状基板11上に位置決めされ、1本のテープ状基板11をピッチPとにより、各作業部において各回路バツメ位置をより一定化することができるため、めることが可能となる。

【0975】また、実装装置101は、
展開モーター16および巻取用モーター
する実装装置メイン制御部と、ICチップ
2からチップ部品リフロー作業部8までの
各作業部内の各モーター等の非制御部を
制御部を備えており、これらの各サブ

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巻取用モーター１６および巻取用モーター７２に対し回転動作信号がメイン制御部より送られ、テープ状基板巻取用モーター１６および巻取用モーター７２が回転することにより、テープ状基板１１上の基回路パターン１２はピッチＰでもって送られることとなる。よって、各作業部においては、テープ状基板１１が吸着固定され、テープ状基板１１上の１つの回路パターン１２が当該作業部での所定の作業を施され、全ての作業部においてテープ状基板１１の吸着固定が解除された後、当該作業部での作業を施された回路パターン１２はピッチＰでもって次の作業部に送られると共に、各作業部においては当該作業部での作業が施されていない回路パターン１２が供給されることとなり、テープ状基板１１の断欠的な送りの動作制御が可能となる。

【００７６】さらに、上記各作業部の中にテープ状基板１１の各ステージ上への吸着固定の解除ができないようなトラブルが発生した場合には、当該作業部のサブ制御部より吸着固定の解除信号がメイン制御部に送られないこととなり、メイン制御部にてテープ状基板１１の送りを待機状態とさせ、必要に応じてメイン制御部にトラブル警報等を発することをもできるため、集中的にテープ状基板１１の送りの動作管理を行うことができ、実装作業の管理効率を高めることが可能となる。

【００７７】また、従来、実装装置において、様々な形状の基板に対応するために、各作業部間の基板のバッファ部を大きくするか、又は、基板の形状に合わせてバッファ部を交換する必要があった。しかし、テープ状基板１１上の基回路パターン１２のピッチＰに応じて、ＩＣチップ実装前作業部２からチップ部品リフロー作業部６までの間における各作業部間の間隔をピッチＰの倍數にデータコントロールにより可変することにより、データコントロールの設定の調整のみで、様々な回路パターン１２の形状に対応することが可能となる。

【００７８】また、チップ部品リフロー作業部６において、既にＩＣチップ３１が実装されているテープ状基板１１の各回路パターン１２上に、チップ部品５１を熱源６１による加熱により各回路パターン１２上に実装するような場合において、遮蔽板６２を用いて各回路パターン１２上に実装されているＩＣチップ３１の上面全体を覆うことにより、ＩＣチップ３１を熱源６１よりの熱が

り、円滑に巻き取ることが可能となる。

【００８０】また、テープ状基板巻取作業で、ＩＣチップ３１およびチップ部品５１を保護可能なシート状のエンボス状スペーサ７３で、ＩＣチップ３１およびチップ部品５１を覆い保護した後、共にテープ状基板１１をリール７１に巻き、テープ状基板１１がリール７１で巻に、ＩＣチップ３１およびチップ部品６板１１と直接接触することが無くなるため、ＩＣチップ３１およびチップ部品５１の実装位置ずれことができ、ＩＣチップ３１およびチップ部品５１の低下を防止することが可能となる。

【００８１】また、テープ状基板１１は給作業部１からテープ状基板巻取作業部７、テープ状基板１１の送り方向に沿って設けられたローラー１７ａ、１７ｂの間のテンションを設けることにより、常にテープ状基板１１がかけられた状態となる。よって、テープ状基板１１からテープ状基板巻取作業部７、テープ状基板１１を強ひくことなく送ることができ、チップ部品実装位置ずれ等を防止することが可能となる。

【００８２】また、テープ状基板１１の停止時間１は、ＩＣチップ実装前作業部２からリフロー作業部６までの各作業部における時間１。～ｎ。の最大値１。、。、。により決定されることとなる。作業部における各作業に要する時間１。～ｎ。に該当する作業部において、作業効率化することにより、当該作業部における時間も同様に分割され、小さくなる。作業工程分割後の各作業部における各作業に要する時間１。～ｎ。の最大値１。、。、。は、作業工程後の当該作業部における作業に要する時間１。～ｎ。の最大値１。、。、。より小さくすることができ、テープ状基板１１の断欠的な送りの停止時間１を短縮化することにより、装置コストの削減を図ることが可能となる。

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作業部における作業部単位を示す。

【0084】例えば、テープ状基板11に多数のICチップ31を実装する必要があるような場合において、ICチップ実装前作業部2からチップ部品リフロー作業部6までの各作業部の内、ICチップ実装前作業部2とICチップ実装作業部3の作業部ユニット数をそれぞれ複数化させ、複数ユニット化されたICチップ実装前作業部2におけるそれぞれの作業部ユニットにおいて接合材料21の貼り付け供給作業を段階的に行い、複数ユニット化されたICチップ実装作業部におけるそれぞれの作業部ユニットにおいてICチップ31の実装作業を段階的に行うことにより、多数のICチップ31のテープ状基板11への実装作業に対応する。

【0085】上記第2の実施形態によれば、ICチップ実装前作業部2からチップ部品リフロー作業部6までの各作業部のユニット数が増やされたことにより、各作業部における1つの作業部ユニットで電子部品の実装作業を施すことができないような多数または多種類の電子部品に対して、実装される電子部品の数量や種類に応じて複数ユニット化された各作業部において、各電子部品の実装作業を施すことができるため、例えば、テープ状基板11の各回路パターン12上に、ICチップ31およびチップ部品51等の多数または多種類の電子部品を実装するような場合において、複数の回路パターン12に対して、複数ユニット化された1つの作業部にて同時に1つの作業を施すことができ、また、各回路パターン12内に、同一作業が施される部分が複数あるような場合には、複数ユニット化された1つの作業部における各ユニットの作業部にて、各回路パターン12の上記各同一作業が施される部分に対し、順次段階的に作業を施すことができ、多数または多種類の電子部品が実装されるようなテープ状基板11に対してもこの電子部品実装装置で対応することが可能となる。

【0086】なお、上記様々な実施形態の内の任意の実施形態を適宜組み合わせることにより、それぞれの有する効果を奏するようにすることができる。

【0087】

【発明の効果】本発明の上記第1の態様によれば、基板送りの時間ロスを短縮し、実装コストの削減を図ることが可能となり、さらに、実装装置の稼働率を上げ、生産

め、上記個片の基板をまとめてから供給、まとめてから取り出す作業において、節減があった。

【0089】しかし、本発明の上記第1の子部品の実装方法においては、回路パターンのピッチをもって連続するように形成された基板を用い、この1本の上記テープ状基板より、上記テープ状基板の個欠的な送りのテープ状基板の上記各回路パターンに上記実装を行うことにより、上記テープ状基板の回路パターンに上記各電子部品の実装作業に、上記各電子部品の実装作業が行われれば、上記実装作業を施された上記1つの一定間隔のピッチでもって送り出される作業が施されていない別の1つの回路パターンのピッチでもって供給されることとなる業が繰り返されることとなる。

【0090】従って、基板を一定数量単位という作業を無くすことができ、基板送り、搬送することができ、実装コストの削減を図ることができる。さらに、実装装置の稼働率を上げ、生産性を高めることが可能となる。

【0091】また、従来の電子部品の実装は、上記各電子部品の実装作業が行われ、個片の基板が送られることとなるため、上記実装作業が行われる場所において、上記送り位置を一定化することが困難である有していた。しかし、上記テープ状基板の回路パターンが、一定の間隔ピッチをもって形成されることにより、上記各回路パターンテープ状基板上に位置決めされているこの上記テープ状基板を一定の間隔ピッチとにより、上記各電子部品の実装作業において、上記各回路パターンの送り位置を定めることができるため、作業効率を高める。

【0092】本発明の上記第2の態様によれば、送りの時間ロスを短縮し、実装コストの削減が可能となり、さらに、実装装置の稼働率を高めることが可能となる。

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間隔のピッチをもって連続するように形成された上記テープ状基板を用い、この1本の上記テープ状基板を間欠的に送り、上記テープ状基板の間欠的な送りの停止時に、上記テープ状基板の上記各回路パターンに上記各電子部品の実装を行うことにより、上記テープ状基板上の1つの上記回路パターンに上記各作業工程で所定の作業が施される毎に、上記作業が施された上記回路パターンは一定の間隔ピッチをもって次の作業工程に送られながら、上記各作業工程においては当該作業工程での作業が施されていない別の上記1つの回路パターンが供給されることとなり、これらの作業が繰り返されることとなる。

【0095】従って、上記各作業工程においては、基板を一定数量単位にまとめるという作業を無くすことができ、基板送りの時間ロスを短縮することができ、実装コストの削減を図ることが可能となる。さらに、各作業工程において稼働率を上げることができ、生産性を高めることが可能となる。

【0096】また、従来の電子部品の実装方法においては、上記各電子部品の上記各実装作業工程に上記各個片の基板が送られることとなるため、上記各作業工程において上記各個片の基板の送り位置を一定化することが困難であるという問題点も有していた。しかし、上記テープ状基板上に上記回路パターンが、一定の間隔ピッチをもって連続するように形成されることにより、上記各回路パターンは予め、上記テープ状基板上に位置決めされていることとなり、上記1本のテープ状基板を一定の間隔ピッチをもって送ることにより、上記各作業工程において上記各回路パターンの送り位置をより一定化することができるため、作業効率を高めることが可能となる。

【0097】本発明の上記第3～10の態様によれば、従来、用いられているICチップやチップ部品の基板への種々の実装方法を、本発明にかかるテープ状基板への電子部品の実装方法においても、上記各作業工程において適用することができるため、高い汎用性を持った電子部品の実装方法を提供することが可能となる。

【0098】本発明の上記第11の態様によれば、基板のバッファ部を不要とすることができ、実装装置のサイズを小さくすることが可能となるとともに、基板送りの時間ロスを短縮し、実装コストの削減を図ることが可

れて送り出されるとともに、上記実装作業しない別の上記基板が一定数量単位にまとめるバッファ部に再び供給されるというこれと繰り返されていた。そのため、上記個片の始めの上記バッファ部が必要であり、その基板をまとめてから供給する作業および取り出す作業において、基板送りの時間

【0100】しかし、本発明の第11の部品の実装装置においては、回路パターンピッチをもって連続するように形成され、を用い、この1本の上記テープ状基板を製品実装作業部に送り、上記テープ状基板の停止時に、上記電子部品実装作業部に基板の上記各回路パターンに上記各電子部品を実装することにより、上記テープ状基板上の1本に上記各電子部品の実装作業が施され、電子部品実装作業部においては、上記実装した上記1つの回路パターンが一定間隔のピッチで送り出されながら、上記実装作業が施された上記1つの回路パターンが一定間隔のピッチで送ることとなり、これらの作業が繰り返される。

【0101】従って、基板を一定数量単位にまとめるという作業を無くすことができるとともに、一定数量単位にまとめるための基板の上記バッファ部とすることができる。よって、実装装置を小さくすることが可能となるとともに、基板を短縮することができ、実装コストの削減が可能となる。さらに、実装装置の稼働率で、生産性を高めることが可能となる。

【0102】また、従来の電子部品の実装は、上記電子部品実装作業部に上記個片の基板が送られることとなるため、上記電子部品実装作業部において上記個片の基板の送り位置を一定化することが困難であるという問題点も有していた。しかし、基板上に上記回路パターンが、一定の間隔で連続するように形成されることにより、パターンは予め、上記テープ状基板上に位置決めされていることとなり、1本の上記テープ状基板を一定の間隔ピッチをもって送ることにより、上記電子部品

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材料の断面図。(c)は加熱・加圧ツールと接合材料およびテープ状基板の断面図。(d)は接合材料がテープ状基板に貼り付けられた状態の断面図。(e)はペースト状の接合材料をテープ状基板に塗布供給している状態の斜視図である。

【図6】 本発明の第1の実施形態にかかるテープ状基板への電子部品の実装方法のICチップマウント作業部における作業方法を示す図であり、(a)はICチップの断面図、(b)、(c)は加熱・加圧ツールによりICチップがテープ状基板に仮圧着される状態の断面図、(d)はICチップがテープ状基板に仮圧着された状態の断面図である。

【図7】 本発明の第1の実施形態にかかるテープ状基板への電子部品の実装方法のICチップ本圧着作業部における作業方法を示す図であり、(a)は加熱・加圧ツールの断面図、(b)は加熱・加圧ツールによりICチップがテープ状基板に本圧着される状態の断面図、

(c)はICチップがテープ状基板に本圧着された状態の断面図、(d)は接合材料に異方性導電膜を用いた場合におけるICチップがテープ状基板に本圧着された状態の断面図である。

【図8】 本発明の第1の実施形態にかかるテープ状基板への電子部品の実装方法のチップ部品実装前作業部における作業方法を示す図であり、テープ状基板上にクリーム半田が供給される状態の断面図である。

【図9】 本発明の第1の実施形態にかかるテープ状基板への電子部品の実装方法のチップ部品実装作業部における作業方法を示す図であり、テープ状基板上にチップ部品が実装された状態の断面図である。

【図10】 本発明の第1の実施形態にかかるテープ状基板への電子部品の実装方法のチップ部品リフロー作業部における作業方法を示す図であり、テープ状基板状に半田をリフローさせてチップ部品を接合している状態の断面図である。

【図11】 本発明の第1の実施形態にかかるテープ状基板への電子部品の実装方法における電子部品が実装されたテープ状基板をエンボス状スペーサで保護している状態の断面図である。

【図12】 本発明の第1の実施形態にかかるテープ状基板への電子部品実装装置における制御系統図である。

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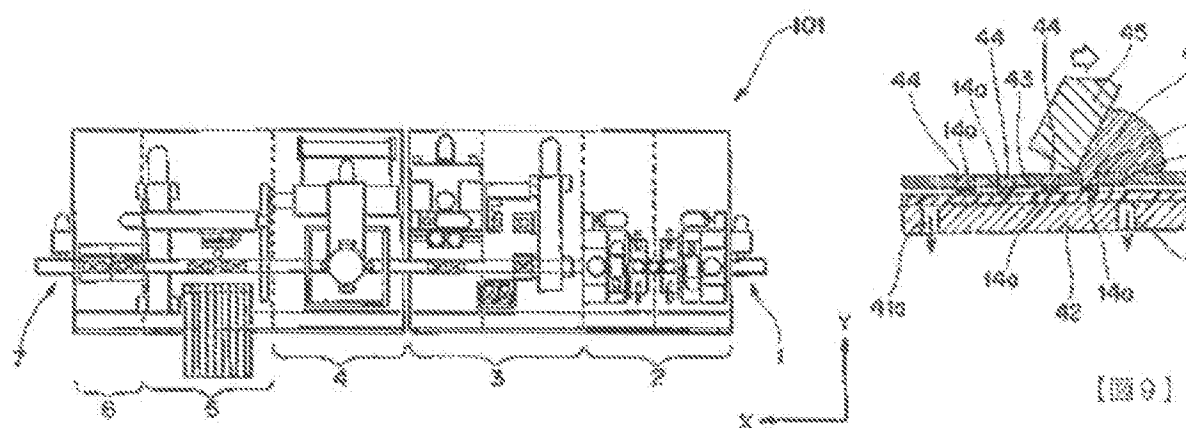
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 ップ部品実装作業部、6-チップ部品リ
 フロー作業部、7-テープ状基板無取
 作部、7a-テ
 1-テープ状基板、12-回路パターン、
 ップ接合部、13a-ICチップ接合部、
 ップ部品接合部、14a-チップ部品、
 15-リール、16-テープ状基板巻取
 7a-案内ローラー、17b-案内ロー
 ンションローラー、20-ステージ、2
 21a-導電性粒子、22-保護シート、
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 用モータ、23c-切断部、24-加熱
 25-ペースト状の接合材料、26-デ
 7-吸引部、30a-ステージ、30b-
 1-ICチップ、31a-ICチップの
 パンプ、32-部品トレイ、33-反転
 転部のY方向移動用モーター、33b-
 モーター、33c-反転部のX方向移動
 4-ツール、34a-ツールのY方向移
 35-加熱・加圧ツール、35a-加熱
 X方向移動用モーター、35b-加熱・
 方向移動用モーター、36-保護シート、
 給部、42-ステージ、42a-吸着穴
 マスク、43a-半田供給用開口部、4
 田、45-スキージ、45a-スキージ
 モーター、45b-スキージのY方向移
 51-チップ部品、51a-チップ部品
 パーツカセット、53-ヘッド、54-
 5-ステージ、55a-吸着穴、61-
 基板、63-ステージ、63a-吸着穴、
 部、71-リール、72-テープ状基板
 一、73-エンボス状スペーサ、101-
 装置、P-ピッチ、1-テープ状基板の
 停止時間、1a-ICチップ実装前作業
 る時間、1a'-ICチップマウント作
 する時間、1a''-ICチップ本圧着作
 する時間、1a'''-チップ部品実装前作業
 る時間、1a''''-チップ部品実装作業部の
 間、1a'''''-チップ部品リフロー作業部の

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【図1】

【図8】

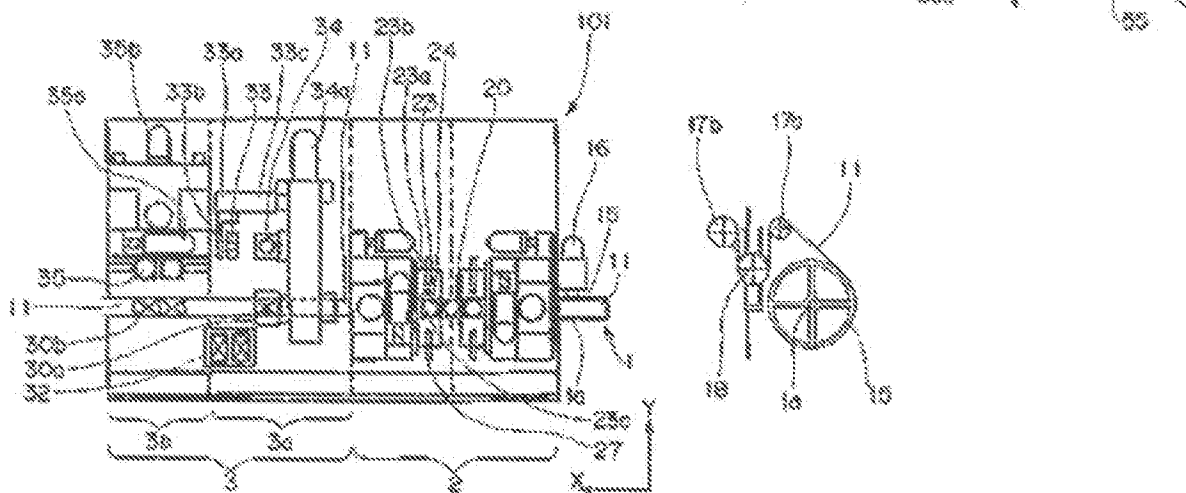


【図2】

【図9】

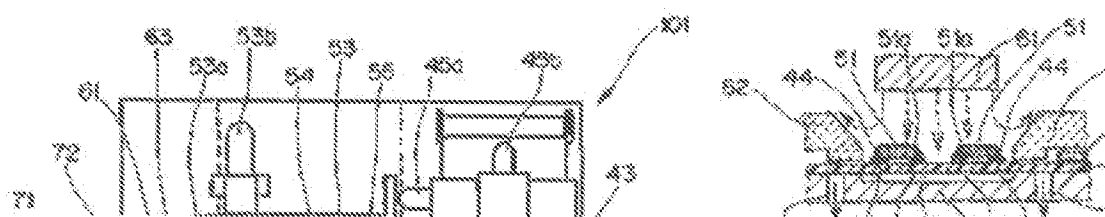
(a)

(b)



【図3】

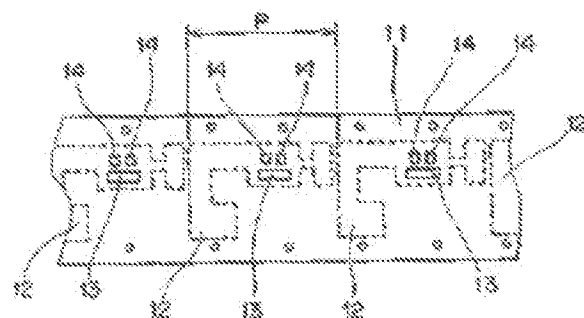
【図10】



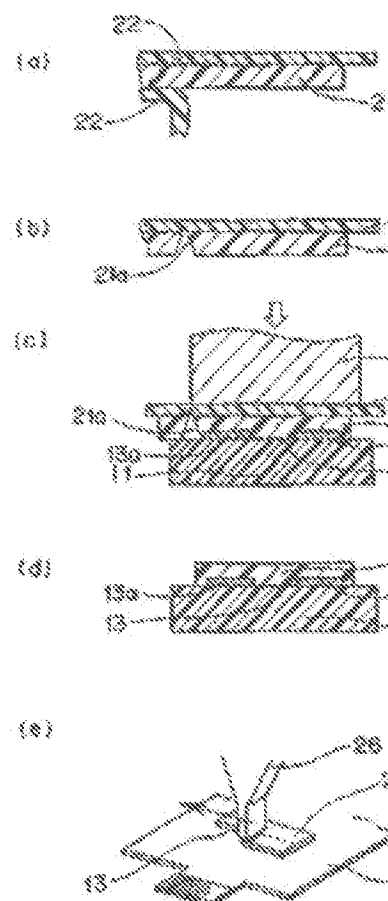
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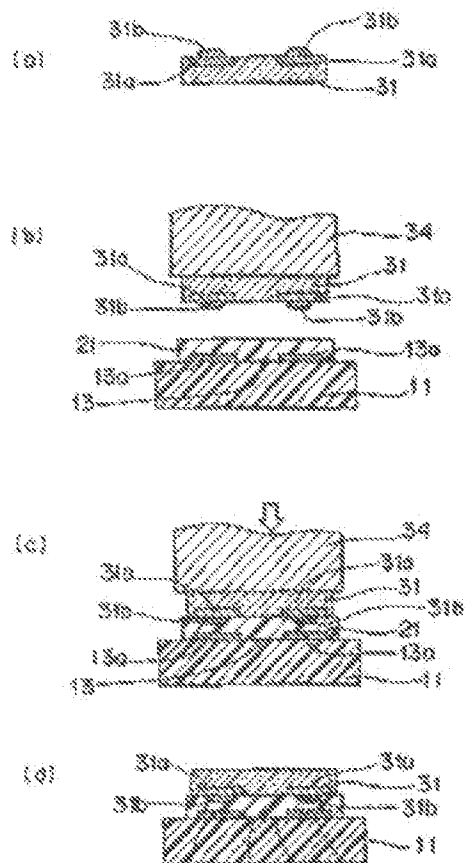
【図4】



【図5】



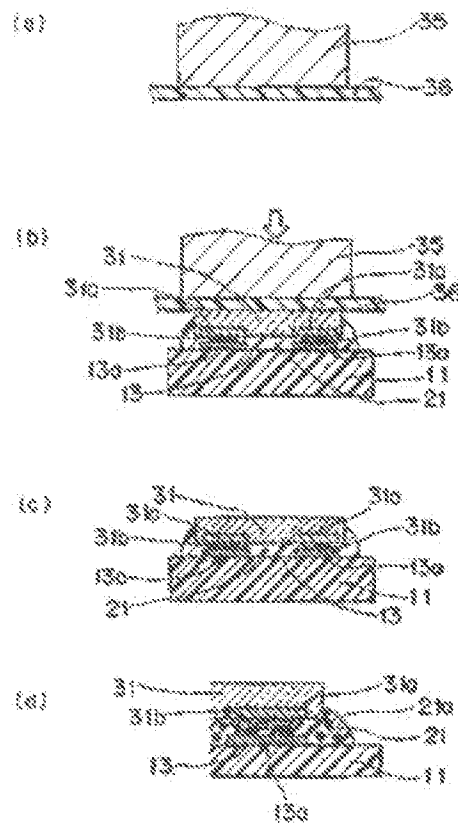
【図6】



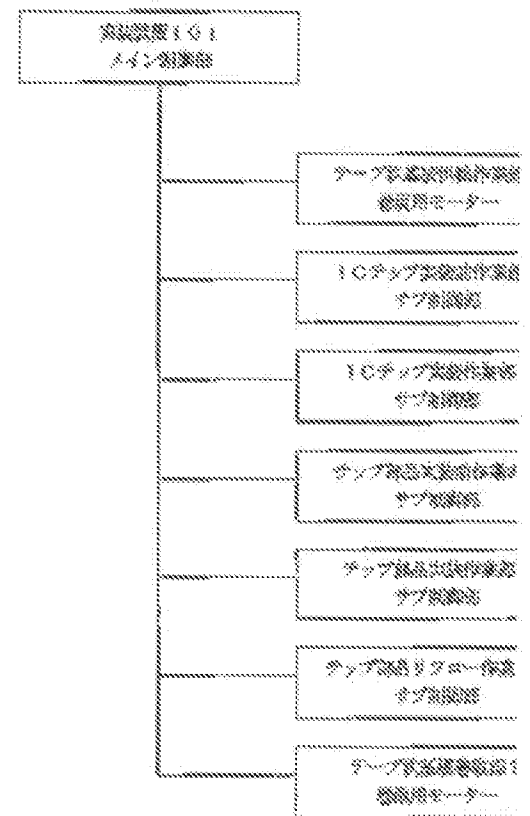
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【図7】



【図12】



フロントページの続き

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LTD

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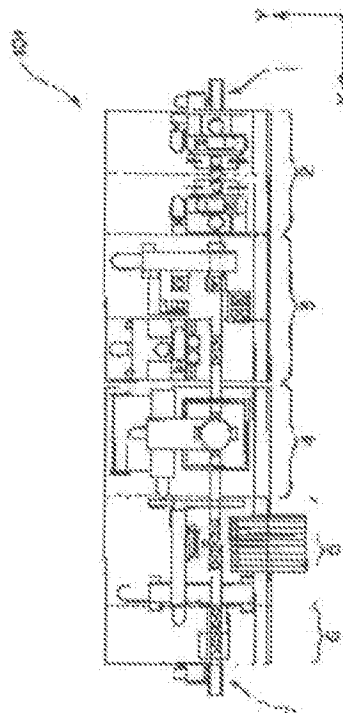
(72)Inventor: YAMAMOTO AKIHIRO
HOSOYA NAOTO

(54) METHOD AND APPARATUS FOR MOUNTING ELECTRONIC COMPONENT ON TAPE-LIKE BOARD

Abstract

PROBLEM TO BE SOLVED: To provide a method of mounting electronic components, a mounting apparatus and a tape-like board used therefor, which has small carry-in/ejection loss time in each working part of the mounting apparatus in mounting electronic components on a board, and enables the mounting apparatus to be made as small as possible.

SOLUTION: Using a tape-like board having a plurality of circuit patterns continuously formed thereon, the tape-like board is fed intermittently, and a plurality of electronic components are mounted on the board during intermittent feed stop. This eliminates the time loss of the board feeding and the need of board buffers provided between working parts of the conventional mounting apparatus, thus making the mounting apparatus size to be reduced in size.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

(Date of final disposal for application)

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. **** shows the word which can not be translated.

3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] Intermittently the tape-like substrate (11) with which two or more circuit patterns (12) which can mount two or more electronic parts (31 51) follow fixed spacing (P), and are formed Delivery, The mounting approach of the electronic parts to the tape-like substrate characterized by mounting each above-mentioned electronic parts (31 51) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) at the time of an intermittent delivery halt of the above-mentioned tape-like substrate (11).

[Claim 2] Two or more electronic parts (31 51) are IC chip (31) and a chip (51). Intermittently the tape-like substrate (11) with which the circuit pattern (12) which has each joint (13 14) of the above-mentioned IC chip (31) and the above-mentioned chip (51) was formed in succession two or more Delivery, Previous work business for IC chip mounting for mounting the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) is given. The above-mentioned IC chip (31) is mounted in the above-mentioned tape-like substrate (11) with which the above-mentioned previous work business for IC chip mounting was given. Previous work business for chip component mounting for mounting the above-mentioned chip (51) in the above-mentioned tape-like substrate (11) with which the above-mentioned IC chip (31) was mounted is given. The above-mentioned chip (51) is mounted in the above-mentioned tape-like substrate (11) with which the above-mentioned previous work business for chip component mounting was given, and solder (44) was supplied. While carrying out a reflow of the solder (44) of the above-mentioned tape-like substrate (11) with which the above-mentioned chip (51) was mounted At the time of an intermittent delivery halt of the above-mentioned tape-like substrate (11) In each above-mentioned routing from which it differs to the routing which carries out a reflow of the solder (44) of the above-mentioned tape-like substrate (11) with which the above-mentioned chip (51) was mounted from the previous work business process for mounting the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) The mounting approach of the electronic parts to the tape-like substrate according to claim 1 which works each above-mentioned routing instantaneous on each above-mentioned circuit pattern (12) with which the above-mentioned tape-like substrates (11) differ.

[Claim 3] In the routing which mounts the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) with which the above-mentioned previous work business for IC chip mounting was given The above-mentioned IC chip (31) with which the bump (31b) was formed in two or more electrodes (31a) of the above-mentioned IC chip (31) Alignment is carried out so that each above-mentioned bump (31b) of the above-mentioned IC chip (31) can join to two or more electrodes (13a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11). The mounting approach of the electronic parts to the tape-like substrate according to claim 2 which joins each bump (31b) of the above-mentioned IC chip (31) to each electrode (13a) on each circuit pattern (12) of the above-mentioned tape-like substrate (11), and mounts the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11).

[Claim 4] In the routing which gives the above-mentioned previous work business for IC chip mounting

for mounting the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) The above-mentioned IC chip (31) with which the bump (31b) was formed in two or more electrodes (31a) of the above-mentioned IC chip (31) As a cementing material (21 25) which can join each electrode (13a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) with each above-mentioned bump (31b) of the above-mentioned IC chip (31) A non-conductive resin sheet (21) or a non-conductive resin paste (25) is supplied on each circuit pattern (12) of a tape-like substrate (11). In the routing which mounts the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) with which the above-mentioned IC chip mounting previous work business was given The above-mentioned non-conductive resin sheet (21) which is the above-mentioned cementing material (21 25) supplied on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11), or a resin paste (25) is minded. It pressurizes mounting the above-mentioned IC chip (31) and heating the above-mentioned resin sheet (21) or the above-mentioned resin paste (25). Each above-mentioned bump (31b) of the above-mentioned IC chip (31) is directly joined to each above-mentioned electrode (13a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11). The mounting approach of the electronic parts to the above-mentioned resin sheet (21) or the tape-like substrate according to claim 2 which maintains junction when the above-mentioned resin paste (25) heat-hardens.

[Claim 5] In the routing which gives the above-mentioned previous work business for IC chip mounting for mounting the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) The above-mentioned IC chip (31) with which the bump (31b) was formed in two or more electrodes (31a) of the above-mentioned IC chip (31) As a cementing material (21 25) which can join each electrode (13a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) with each above-mentioned bump (31b) of the above-mentioned IC chip (31) The resin sheet or resin paste with which the conductive particle (21a) was distributed, Or a conductive resin sheet or a conductive resin paste is supplied on each circuit pattern (12) of a tape-like substrate (11). In the routing which mounts the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) with which the above-mentioned IC chip mounting previous work business was given The above-mentioned resin sheet or the above-mentioned resin paste with which the above-mentioned conductive particle (21a) which is the cementing material (21) supplied on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) was distributed, Or the above-mentioned IC chip (31) is mounted through the resin sheet or resin paste of the above-mentioned conductivity. It pressurizes heating the above-mentioned resin sheet or the above-mentioned resin paste. Each above-mentioned bump (31b) of the above-mentioned IC chip (31) to each above-mentioned electrode (13a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) The above-mentioned conductive particle (21a), Or the mounting approach of the electronic parts to the tape-like substrate according to claim 2 which joins indirectly through the resin sheet or resin paste of the above-mentioned conductivity, and maintains junction when the above-mentioned resin sheet or the above-mentioned resin paste heat-hardens.

[Claim 6] In the routing which gives the above-mentioned previous work business for IC chip mounting for mounting the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) The above-mentioned IC chip (31) with which the bump (31b) was formed in two or more electrodes (31a) of the above-mentioned IC chip (31) As a cementing material (21 25) which can join each electrode (13a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) with each above-mentioned bump (31b) of the above-mentioned IC chip (31) In the routing which mounts the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) with which the metal which is a conductive ingredient was supplied on each circuit pattern (12) of a tape-like substrate (11), and the above-mentioned IC chip mounting previous work business was given The above-mentioned metal which is the cementing material (21) supplied on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) is minded. Mount the above-mentioned IC chip (31), carry out heating fusion of the above-mentioned metal, and each above-mentioned bump (31b) of the above-mentioned IC chip (31) is indirectly joined to each above-mentioned electrode (13a) on each above-

mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) through the above-mentioned metal. The mounting approach of the electronic parts to the tape-like substrate according to claim 2 which maintains junction when the above-mentioned metal heat-hardens.

[Claim 7] Two or more electronic parts (31, 51) are IC chip (31) and a chip (51). Intermittently the tape-like substrate (11) with which the circuit pattern (12) which has each joint (13, 14) of the above-mentioned IC chip (31) and the above-mentioned chip (51) was formed in succession two or more Delivery, Alignment is carried out so that two or more electrodes (31a) of the above-mentioned IC chip (31) can join to two or more electrodes (13a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11). Metal diffusion junction according each electrode (31a) of the above-mentioned IC chip (31) to a supersonic wave is given to each electrode (13a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11). Previous work business for chip component mounting for mounting the above-mentioned chip (51) in the above-mentioned tape-like substrate (11) with which the above-mentioned IC chip (31) was mounted in the above-mentioned tape-like substrate (11), and the above-mentioned IC chip (31) was mounted is given. The above-mentioned chip (51) is mounted in the above-mentioned tape-like substrate (11) with which the above-mentioned previous work business for chip component mounting was given, and solder (44) was supplied. While carrying out a reflow of the solder (44) of the above-mentioned tape-like substrate (11) with which the above-mentioned chip (51) was mounted. At the time of an intermittent delivery halt of the above-mentioned tape-like substrate (11) In each above-mentioned routing from which it differs to the routing which carries out a reflow of the solder (44) of the above-mentioned tape-like substrate (11) with which the above-mentioned chip (51) was mounted from the routing which mounts the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) The mounting approach of the electronic parts to the tape-like substrate according to claim 1 which works each above-mentioned routing instantaneous on each above-mentioned circuit pattern (12) with which the above-mentioned tape-like substrates (11) differ.

[Claim 8] Two or more electronic parts (31, 51) are IC chip (31) and a chip (51). Intermittently the tape-like substrate (11) with which the circuit pattern (12) which has each joint (13, 14) of the above-mentioned IC chip (31) and the above-mentioned chip (51) was formed in succession two or more Delivery, Previous work business for IC chip mounting for mounting the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) is given. The above-mentioned IC chip (31) is mounted in the above-mentioned tape-like substrate (11) with which the above-mentioned previous work business for IC chip mounting was given. Previous work business for chip component mounting for mounting the above-mentioned chip (51) in the above-mentioned tape-like substrate (11) with which the above-mentioned IC chip (31) was mounted is given. The above-mentioned previous work business for chip component mounting is given. A cementing material Alignment is carried out so that two or more electrodes (51a) of the above-mentioned chip (51) can be joined to the above-mentioned tape-like substrate (11) with which (44) was supplied at two or more electrodes (14a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11). Each above-mentioned electrode (51a) of the above-mentioned chip (51) is joined to each electrode (14a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) through the above-mentioned cementing material (44). While mounting the above-mentioned chip (51) in the above-mentioned tape-like substrate (11) with which the above-mentioned IC chip (31) was mounted. At the time of an intermittent delivery halt of the above-mentioned tape-like substrate (11) In each above-mentioned routing from which it differs to the routing which mounts the above-mentioned chip (51) in the above-mentioned tape-like substrate (11) with which the above-mentioned IC chip (31) was mounted from the previous work business process for mounting the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) The mounting approach of the electronic parts to the tape-like substrate according to claim 1 which works each above-mentioned routing instantaneous on each above-mentioned circuit pattern (12) with which the above-mentioned tape-like substrates (11) differ.

[Claim 9] The above-mentioned cementing material (44) is conductive resin, and alignment is carried out so that each above-mentioned electrode (51a) of the above-mentioned chip (51) can be joined to two

or more electrodes (14a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11). It pressurizes heating each above-mentioned electrode (51a) of the above-mentioned chip (51) to each electrode (14a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11). Each above-mentioned electrode (51a) of the above-mentioned chip (51) is indirectly joined to each electrode (14a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) through the above-mentioned conductive resin. The mounting approach of the electronic parts to the tape-like substrate according to claim 8 which maintains junction when the above-mentioned conductive resin heat-hardens.

[Claim 10] The above-mentioned cementing material (44) is a metal, and alignment is carried out so that each above-mentioned electrode (51a) of the above-mentioned chip (51) can be joined to two or more electrodes (14a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11). Each above-mentioned electrode (51a) of the above-mentioned chip (51) is mounted in each electrode (14a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) through the above-mentioned metal. Carry out heating fusion of the above-mentioned metal, and each above-mentioned electrode (51a) of the above-mentioned chip (51) is indirectly joined to two or more electrodes (14a) on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) through the above-mentioned metal. The mounting approach of the electronic parts to the tape-like substrate according to claim 8 which maintains junction when the above-mentioned metal heat-hardens and to mount.

[Claim 11] The tape-like substrate supply activity section which can send intermittently the tape-like substrate (11) with which two or more circuit patterns (12) which can mount two or more electronic parts (31 51) follow fixed spacing (P), and are formed (1). At the time of a halt of intermittent delivery of the above-mentioned tape-like substrate (11) by the above-mentioned tape-like substrate supply activity section (1), on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) The electronic-parts mounting activity section which can mount each above-mentioned electronic parts (31 51) (2, 3, 4, 5, 6). It has the tape-like substrate winding activity section (7) which can roll round intermittently the above-mentioned tape-like substrate (11) with which each above-mentioned electronic parts (31 51) were mounted. And the above-mentioned tape-like substrate supply activity section (1) and the above-mentioned tape-like substrate winding activity section (7) are electronic-parts mounting equipment to the tape-like substrate characterized by it being possible to do supply and the rolling-up activity of the above-mentioned tape-like substrate (11) instantaneous.

[Claim 12] Two or more electronic parts (31 51) are IC chip (31) and a chip (51). The tape-like substrate supply activity section which can send intermittently the tape-like substrate (11) with which the circuit pattern (12) which has each joint (13 14) of the above-mentioned IC chip (31) and the above-mentioned chip (51) was formed in succession two or more (1). The above-mentioned IC chip (31) and the above-mentioned chip (51) The electronic-parts mounting activity section which can be mounted on each above-mentioned circuit pattern (12) of the above-mentioned tape-like substrate (11) (2, 3, 4, 5, 6). It has the tape-like substrate winding activity section (7) which can roll round intermittently the above-mentioned tape-like substrate (11) with which the above-mentioned IC chip (31) and the above-mentioned chip (51) were mounted. IC chip mounting previous work business section with the above-mentioned electronic-parts mounting activity section (2, 3, 4, 5, 6) able to give previous work business for IC chip mounting for mounting the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) (2). IC chip mounting activity section which can mount the above-mentioned IC chip (31) in the above-mentioned tape-like substrate (11) with which the above-mentioned previous work business for IC chip mounting was given (3). The chip component-mounting previous work business section which can give previous work business for chip component mounting for mounting the above-mentioned chip (51) in the above-mentioned tape-like substrate (11) with which the above-mentioned IC chip (31) was mounted (4). The chip component-mounting activity section which can mount the above-mentioned chip (51) in the above-mentioned tape-like substrate (11) with which the above-mentioned previous work business for chip component mounting was given, and solder (44) was supplied (5). It has the chip reflow activity section (6) which carries out a reflow of the solder (44) of the above-mentioned

tape-like substrate (11) with which the above-mentioned chip (51) was mounted. Each above-mentioned activity section (2, 3, 4, 5, 6) from which it differs from the above-mentioned IC chip mounting previous work business section (2) to the above-mentioned chip reflow activity section (6) at the time of a halt of intermittent delivery of the above-mentioned tape-like substrate (11) by the above-mentioned tape-like substrate supply activity section (1) It is possible to work each above-mentioned activity section (2, 3, 4, 5, 6) instantaneous on each above-mentioned circuit pattern (12) with which the above-mentioned tape-like substrates (11) differ. And the above-mentioned tape-like substrate supply activity section (1) and the above-mentioned tape-like substrate winding activity section (7) are electronic-parts mounting equipment of the tape-like substrate according to claim 11 which can do supply and the rolling-up activity of the above-mentioned tape-like substrate (11) instantaneous.

[Claim 13] The above-mentioned tape-like substrate (11) is twisted around a reel (15 71), and is possible. The above-mentioned tape-like substrate feed zone (1) It has the reel feed zone (1a) which can send intermittently the above-mentioned tape-like substrate (11) twisted around the above-mentioned reel (15) by rewinding the above-mentioned reel (15). The above-mentioned tape-like substrate winding activity section (7) Electronic-parts mounting equipment to a tape-like substrate [equipped with the tape stowage (7a) which can be intermittently rolled round by rolling round the above-mentioned tape-like substrate (11) with which each above-mentioned electronic parts (31 51) were mounted to the above-mentioned reel (71)] according to claim 11 or 12.

[Claim 14] Electronic-parts mounting equipment to the tape-like substrate according to claim 12 which equips the multiple of the spacing pitch (P) in which each above-mentioned circuit pattern (12) on the above-mentioned tape-like substrate (11) is formed in spacing between each activity section (2, 3, 4, 5, 6) of a before [from the above-mentioned IC chip mounting previous work business section (2) / the above-mentioned chip reflow activity section (6)] with the data control section in which adjustable is possible.

[Claim 15] The above-mentioned tape-like substrate winding activity section (7) the above-mentioned tape-like substrate (11) protected with the letter spacer of embossing (73) of the shape of a sheet which has the concave heights which can protect each above-mentioned electronic parts (31 51) mounted in the above-mentioned tape-like substrate (11)

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. ***** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the tape-like substrate used for the electronic-parts mounting approach to the tape-like substrate which mounts two or more electronic parts in each above-mentioned circuit pattern of the tape-like substrate with which two or more circuit patterns were formed continuously, mounting equipment, and it.

[0002]

[Description of the Prior Art] Conventionally, mounting to the substrate of electronic parts, such as IC chip and a chip, packed the substrate of the piece of an individual fixed quantity every, and delivery and after that, the band conveyor etc. performed the substrate of the piece of an individual, and it was performing one flow junction of the electrode of electronic parts, and the electrode of a substrate at a time to each routing in mounting equipment in the predetermined activity location in each process by supply of delivery and a cementing material, mounting of electronic parts, heating, pressurization of a cementing material, etc.

[0003]

[Problem(s) to be Solved by the Invention] However, in the thing of the above-mentioned structure, in order to lessen the time amount loss of substrate delivery by the difference in the working hours in each process in mounting equipment The substrate which prepared the buffer section of a substrate for every routing in mounting equipment, and was processed in each process in each buffer section Delivery. Since the substrate collectively processed by the fixed volume unit was sent to the following routing after the substrate of a fixed volume unit collects in each buffer section, there was a problem that equipment size became large. Moreover, in each routing in equipment, in the following process, it is in the state waiting for processing of a substrate, and there was a trouble that the time amount loss of substrate delivery could not be lost completely until the processing all whose substrates of a fixed volume unit are predetermined was performed and discharged and it sent fixed volume unit conclusion ***** to the following process. Therefore, the substrate was processed continuously, it was small in equipment as much as possible, and the approach of lessening the time amount loss of substrate delivery was desired.

[0004] Therefore, the purpose of this invention is to solve the above-mentioned problem, and the tape-like substrate with which two or more circuit patterns are formed continuously is used. The above-mentioned tape-like substrate by mounting two or more electronic parts in delivery and the above-mentioned tape-like substrate intermittently The time amount loss of substrate delivery is lost and it is in offering the tape-like substrate used for the electronic-parts mounting approach to the tape-like substrate which can make mounting equipment size small, mounting equipment, and them.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention is constituted as follows.

[0006] If this invention is caused like the 1st voice, the mounting approach of the electronic parts to the

tape-like substrate characterized by to mount each above-mentioned electronic parts for the tape-like substrate with which two or more circuit patterns which can mount two or more electronic parts follow fixed spacing, and are formed intermittently on each above-mentioned circuit pattern of the above-mentioned tape-like substrate at the time of an intermittent delivery halt of delivery and the above-mentioned tape-like substrate will offer.

[0007] If this invention is caused like the 2nd voice, two or more electronic parts will be IC chip and a chip. Intermittently the tape-like substrate with which the circuit pattern which has each joint of the above-mentioned IC chip and the above-mentioned chip was formed in succession two or more Delivery, Previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate is given. The above-mentioned IC chip is mounted in the above-mentioned tape-like substrate with which the above-mentioned previous work business for IC chip mounting was given. Previous work business for chip component mounting for mounting the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip was mounted is given. While carrying out a reflow of the solder of the above-mentioned tape-like substrate with which the above-mentioned chip was mounted in the above-mentioned tape-like substrate with which the above-mentioned previous work business for chip component mounting was given, and solder was supplied, and the above-mentioned chip was mounted In each above-mentioned routing from which it differs to the routing which carries out a reflow of the solder of the above-mentioned tape-like substrate with which the above-mentioned chip was mounted from the previous work business process for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate at the time of an intermittent delivery halt of the above-mentioned tape-like substrate on each above-mentioned circuit pattern with which the above-mentioned tape-like substrates differ, each above-mentioned routing is worked instantaneous -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 1st voice.

[0008] In the routing which mounts the above-mentioned IC chip in the above-mentioned tape-like substrate with which the above-mentioned previous work business for IC chip mounting was given if this invention is caused like the 3rd voice The above-mentioned IC chip with which the bump was formed in two or more electrodes of the above-mentioned IC chip Alignment is carried out so that each above-mentioned bump of the above-mentioned IC chip can join to two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. each bump of the above-mentioned IC chip is joined to each electrode on each circuit pattern of the above-mentioned tape-like substrate, and the above-mentioned IC chip is mounted in the above-mentioned tape-like substrate -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 2nd voice.

[0009] In the routing which will give the above-mentioned previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate if this invention is caused like the 4th voice The above-mentioned IC chip with which the bump was formed in two or more electrodes of the above-mentioned IC chip is used as the cementing material which can join each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate with each above-mentioned bump of the above-mentioned IC chip. In the routing which mounts the above-mentioned IC chip in the above-mentioned tape-like substrate with which a non-conductive resin sheet or a non-conductive resin paste was supplied on each circuit pattern of a tape-like substrate, and the above-mentioned IC chip mounting previous work business was given The above-mentioned non-conductive resin sheet which is the above-mentioned cementing material supplied on each above-mentioned circuit pattern of the above-mentioned tape-like substrate, or a resin paste is minded. It pressurizes mounting the above-mentioned IC chip and heating the above-mentioned resin sheet or the above-mentioned resin paste. each above-mentioned bump of the above-mentioned IC chip is directly joined to each above-mentioned electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate, and junction is maintained when the above-mentioned resin sheet or the above-mentioned resin paste heat-hardens -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 2nd voice.

[0010] In the routing which will give the above-mentioned previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate if this invention is caused like the 5th voice The above-mentioned IC chip with which the bump was formed in two or more electrodes of the above-mentioned IC chip is used as the cementing material which can join each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate with each above-mentioned bump of the above-mentioned IC chip. The resin sheet with which the conductive particle was distributed, a resin paste, a conductive resin sheet, or a resin paste is supplied on each circuit pattern of a tape-like substrate. In the routing which mounts the above-mentioned IC chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip mounting previous work business was given The above-mentioned resin sheet with which the above-mentioned conductive particle which is the cementing material supplied on each above-mentioned circuit pattern of the above-mentioned tape-like substrate was distributed, the above-mentioned resin paste, the above-mentioned conductive resin sheet, or a resin paste is minded. It pressurizes mounting the above-mentioned IC chip and heating the above-mentioned resin sheet or the above-mentioned resin paste. Each above-mentioned bump of the above-mentioned IC chip to each above-mentioned electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate The above-mentioned conductive particle, or it joins indirectly through the resin sheet or resin paste of the above-mentioned conductivity, and junction is maintained when the above-mentioned resin sheet or the above-mentioned resin paste heat-hardens -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 2nd voice.

[0011] In the routing which will give the above-mentioned previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate if this invention is caused like the 6th voice The above-mentioned IC chip with which the bump was formed in two or more electrodes of the above-mentioned IC chip is used as the cementing material which can join each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate with each above-mentioned bump of the above-mentioned IC chip. In the routing which mounts the above-mentioned IC chip in the above-mentioned tape-like substrate with which the metal which is a conductive ingredient was supplied on each circuit pattern of a tape-like substrate, and the above-mentioned IC chip mounting previous work business was given The above-mentioned metal which is the cementing material supplied on each above-mentioned circuit pattern of the above-mentioned tape-like substrate is minded. Mount the above-mentioned IC chip, carry out heating fusion of the above-mentioned metal, and each above-mentioned bump of the above-mentioned IC chip is indirectly joined to each above-mentioned electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate through the above-mentioned metal. junction is maintained when the above-mentioned metal heat-hardens -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 2nd voice.

[0012] If this invention is caused like the 7th voice, two or more electronic parts will be IC chip and a chip. Intermittently the tape-like substrate with which the circuit pattern which has each joint of the above-mentioned IC chip and the above-mentioned chip was formed in succession two or more Delivery, Alignment is carried out so that two or more electrodes of the above-mentioned IC chip can join to two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. Metal diffusion junction according each electrode of the above-mentioned IC chip to a supersonic wave is given to each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. Previous work business for chip component mounting for mounting the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip was mounted in the above-mentioned tape-like substrate, and the above-mentioned IC chip was mounted is given. While carrying out a reflow of the solder of the above-mentioned tape-like substrate with which the above-mentioned chip was mounted in the above-mentioned tape-like substrate with which the above-mentioned previous work business for chip component mounting was given, and solder was supplied, and the above-mentioned chip was mounted In each above-mentioned routing from which it differs from the routing which mounts the above-mentioned IC chip at the above-mentioned tape-like

substrate to the routing which carries out a reflow of the solder of the above-mentioned tape-like substrate with which the above-mentioned chip was mounted at the time of an intermittent delivery halt of the above-mentioned tape-like substrate on each above-mentioned circuit pattern with which the above-mentioned tape-like substrates differ, each above-mentioned routing is worked instantaneous -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 1st voice.

[0013] If this invention is caused like the 8th voice, two or more electronic parts will be IC chip and a chip. Intermittently the tape-like substrate with which the circuit pattern which has each joint of the above-mentioned IC chip and the above-mentioned chip was formed in succession two or more Delivery, Previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate is given. The above-mentioned IC chip is mounted in the above-mentioned tape-like substrate with which the above-mentioned previous work business for IC chip mounting was given. Previous work business for chip component mounting for mounting the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip was mounted is given. Alignment is carried out so that two or more electrodes of the above-mentioned chip can be joined to the above-mentioned tape-like substrate with which the above-mentioned previous work business for chip component mounting was given, and the cementing material was supplied at two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. While mounting the above-mentioned chip in the above-mentioned tape-like substrate with which each above-mentioned electrode of the above-mentioned chip was joined to each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate through the above-mentioned cementing material, and the above-mentioned IC chip was mounted In each above-mentioned routing from which it differs to the routing which mounts the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip was mounted from the previous work business process for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate at the time of an intermittent delivery halt of the above-mentioned tape-like substrate on each above-mentioned circuit pattern with which the above-mentioned tape-like substrates differ, each above-mentioned routing is worked instantaneous -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 1st voice.

[0014] If this invention is caused like the 9th voice, the above-mentioned cementing material will be conductive resin, and alignment will be carried out so that each above-mentioned electrode of the above-mentioned chip can be joined to two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. It presaturizes heating each above-mentioned electrode of the above-mentioned chip to each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. each above-mentioned electrode of the above-mentioned chip is indirectly joined to each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate through the above-mentioned conductive resin, and junction is maintained when the above-mentioned conductive resin heat-hardens -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 8th voice.

[0015] If this invention is caused like the 10th voice, the above-mentioned cementing material will be a metal, and alignment will be carried out so that each above-mentioned electrode of the above-mentioned chip can be joined to two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. Each above-mentioned electrode of the above-mentioned chip is mounted in each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate through the above-mentioned metal. Carry out heating fusion of the above-mentioned metal, and each above-mentioned electrode of the above-mentioned chip is indirectly joined to two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate through the above-mentioned metal. junction is maintained when the above-mentioned metal heat-hardens -- it mounts -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 8th voice.

[0016] The tape-like substrate supply activity section which can send intermittently the tape-like

substrate with which two or more circuit patterns which can mount two or more electronic parts follow fixed spacing, and are formed if this invention is caused like the 11th voice, At the time of a halt of intermittent delivery of the above-mentioned tape-like substrate by the above-mentioned tape-like substrate supply activity section, on each above-mentioned circuit pattern of the above-mentioned tape-like substrate The electronic-parts mounting activity section which can mount each above-mentioned electronic parts, It has the tape-like substrate winding activity section which can roll round intermittently the above-mentioned tape-like substrate with which each above-mentioned electronic parts were mounted. And the above-mentioned tape-like substrate supply activity section and the above-mentioned tape-like substrate winding activity section offer the electronic-parts mounting equipment to the tape-like substrate characterized by it being possible to do supply and the rolling-up activity of the above-mentioned tape-like substrate instantaneous.

[0017] If this invention is caused like the 12th voice, two or more electronic parts will be IC chip and a chip. The tape-like substrate supply activity section which can send intermittently the tape-like substrate with which the circuit pattern which has each joint of the above-mentioned IC chip and the above-mentioned chip was formed in succession two or more, The above-mentioned IC chip and the above-mentioned chip The electronic-parts mounting activity section which can be mounted on each above-mentioned circuit pattern of the above-mentioned tape-like substrate, It has the tape-like substrate winding activity section which can roll round intermittently the above-mentioned tape-like substrate with which the above-mentioned IC chip and the above-mentioned chip were mounted. IC chip mounting previous work business section with the above-mentioned electronic-parts mounting activity section able to give previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate, IC chip mounting activity section which can mount the above-mentioned IC chip in the above-mentioned tape-like substrate with which the above-mentioned previous work business for IC chip mounting was given, The chip component-mounting previous work business section which can give previous work business for chip component mounting for mounting the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip was mounted, The chip component-mounting activity section which can mount the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned previous work business for chip component mounting was given, and solder was supplied, It has the chip reflow activity section which carries out a reflow of the solder of the above-mentioned tape-like substrate with which the above-mentioned chip was mounted. Each above-mentioned activity section from which it differs from the above-mentioned IC chip mounting previous work business section to the above-mentioned chip reflow activity section at the time of a halt of intermittent delivery of the above-mentioned tape-like substrate by the above-mentioned tape-like substrate supply activity section It is possible to work each above-mentioned activity section instantaneous on each above-mentioned circuit pattern with which the above-mentioned tape-like substrates differ. And the above-mentioned tape-like substrate supply activity section and the above-mentioned tape-like substrate winding activity section it is possible to do supply and the rolling-up activity of the above-mentioned tape-like substrate instantaneous -- the electronic-parts mounting equipment of the tape-like substrate of a publication is offered like the 11th voice.

[0018] If this invention is caused like the 13th voice, the above-mentioned tape-like substrate is twisted around a reel, and is possible. The above-mentioned tape-like substrate feed zone It has the reel feed zone which can send intermittently the above-mentioned tape-like substrate twisted around the above-mentioned reel by rewinding the above-mentioned reel. The above-mentioned tape-like substrate winding activity section the 11th mode equipped with the tape stowage which can be intermittently rolled round by rolling round the above-mentioned tape-like substrate with which each above-mentioned electronic parts were mounted to the above-mentioned reel -- or the electronic-parts mounting equipment to the tape-like substrate of a publication is offered like the 12th voice.

[0019] if this invention is caused like the 14th voice, the multiple of the spacing pitch in which each above-mentioned circuit pattern on the above-mentioned tape-like substrate is formed in spacing between each activity section of a before [from the above-mentioned IC chip mounting previous work

business section / the above-mentioned chip reflow activity section] will be equipped with the data-control section in which adjustable is possible -- the electronic-parts mounting equipment to the tape-like substrate of a publication is offered like the 12th voice.

[0020] If this invention is caused like the 15th voice, the above-mentioned tape-like substrate winding activity section will be equipped with the tape stowage which can roll round intermittently the above-mentioned tape-like substrate protected with the letter spacer of embossing of the shape of a sheet which has the concave heights which can protect each above-mentioned electronic parts mounted in the above-mentioned tape-like substrate by rolling round to the above-mentioned reel -- the electronic-parts mounting equipment to the tape-like substrate of a publication offers like the 13th voice.

[0021] If this invention is caused like the 16th voice, it will have further the cooling section which can cool the above-mentioned tape-like substrate heated in the above-mentioned chip reflow activity section between the above-mentioned chip reflow activity section and the above-mentioned tape-like substrate winding activity section -- the electronic-parts mounting equipment to the tape-like substrate of a publication is offered like the 12th voice.

[0022]

[Embodiment of the Invention] Below, the gestalt of operation concerning this invention is explained at a detail based on a drawing.

[0023] Drawing 1 is the whole electronic-parts mounting equipment 101 top view using the electronic-parts mounting approach to the tape-like substrate concerning the 1st operation gestalt of this invention. In drawing 1, electronic-parts mounting equipment 101 long and slender in a longitudinal direction has two or more activity sections for mounting electronic parts, for example, IC chip, and a chip in a tape-like substrate on the top face along the direction of X which is a feed direction of a tape-like substrate, adjoining each other. These activity sections are roughly divided, are constituted by each seven activity sections, and are constituted by the tape-like substrate supply activity section 1, IC chip mounting previous work business section 2, IC chip mounting activity section 3, the chip component-mounting previous work business section 4, the chip component-mounting activity section 5, the chip reflow activity section 6, and the tape-like substrate winding activity section 7.

[0024] In the tape-like substrate supply activity section 1, a tape-like substrate is supplied to a tape-like substrate by rewinding and IC chip mounting previous work business section 2 from the reel around which the tape-like substrate formed so that it might continue that bottom two or more mutually-independent circuit patterns are also at fixed spacing on one tape currently formed with the insulating base is wound.

[0025] Next, the cementing material for joining IC chip to a tape-like substrate is supplied to IC chip joint on each circuit pattern of a tape-like substrate, and it is made to join IC chip to a tape-like substrate through a cementing material by thermocompression bonding in IC chip mounting activity section 3 after that in IC chip mounting previous work business section 2.

[0026] Next, in the chip component-mounting previous work business section 4, supply the solder for joining a chip to a tape-like substrate at the chip joint on a tape-like substrate, and it sets in the chip component-mounting activity section 5. A chip is attached in a tape-like substrate through solder, it heats in the chip reflow activity section 6, the solder currently supplied on the tape-like substrate is fused, a chip is joined to a tape-like substrate, and the tape-like substrate heated by the air blow etc. is cooled after that.

[0027] Finally, in the tape-like substrate winding activity section 7, the tape-like substrate with which IC chip and the chip were mounted in each circuit pattern is rolled round to a reel.

[0028] Moreover, a tape-like substrate is set in each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6. After adsorption immobilization is carried out on each stage, the activity of a law is performed everywhere, and after adsorption immobilization of a up to [each stage of a tape-like substrate] is canceled in all the activity sections, a tape-like substrate is sent to each following activity section from each activity section to which the activity of a law was performed everywhere.

[0029] In the side elevation of the tape-like substrate supply activity section 1 shown in drawing 2 (b)

moreover, the tape-like substrate 11 By the tension roller 18 between the guide rollers 17a and 17b of the pair prepared along the direction of X which is a tape-like substrate feed direction of a between from the tape-like substrate supply activity section 1 to the tape-like substrate winding activity section 7 It is in the condition that fixed tension was always applied, and it is sent, without slackening from the tape-like substrate supply activity section 1 to the tape-like substrate fetch activity section 7.

[0030] The mounting approach of the electronic parts to the tape-like substrate using the electronic-parts mounting equipment 101 constituted by each activity section in each above process is explained below at a detail.

[0031] As shown in drawing 4 , it is formed on the tape-like substrate 11 so that IC chip and the same circuit pattern 12 which can mount a chip may have the pitch P of fixed spacing and may continue. The distance of the die-length direction of the tape-like substrate 11 in the same location in each circuit pattern 12 between the same following circuit patterns 12 which follow one certain circuit pattern 12 is indicated to be a pitch P here. The tape-like substrate 11 is intermittently supplied to IC chip mounting previous work business section 2 which is the following activity section, rewinding the tape-like substrate 11 from a reel 15 by attaching in reel feed zone 1a in the tape-like substrate supply activity section 1 the reel 15 by which this tape-like substrate 11 is twisted, and carrying out intermittent rotation of this reel 15 using the motor 16 for tape-like substrate rewinding. In addition, in each activity section, a predetermined activity is done to each circuit pattern 12.

[0032] Next, after each circuit pattern 12 of the tape-like substrate 11 is sent from the tape-like substrate supply activity section to IC chip mounting previous work business section 2 of drawing 2 (a), in IC chip mounting previous work business section 2, adsorption maintenance of the tape-like substrate 11 which has each circuit pattern 12 is carried out by being drawn in in the adsorption hole of a stage 20 on a stage 20.

[0033] Next, as shown in drawing 5 (a), the cementing material 21 which be a non-conductive resin ingredient for join two or more electrode 13a of IC chip joint 13 of each circuit pattern 12 in the bump and the tape-like substrate 11 which be formed with conductor material, such as Au, on the electrode of the plurality of IC chip be formed in the shape of [from which both sides be protected by the protection film 22] a sheet. By supplying the cementing material 21 in the condition of having been wound around reel 23a, in the sheet material feed zone 23, and carrying out intermittent rotation of this reel 23a using motor 23b for sheet material rewinding, as shown in drawing 2 (a) As one side of the protection sheet 22 is removed with rewinding from reel 23a and a cementing material 21 is further shown in drawing 5 (b) After having been cut by cutting plane 21a by the piece of an individual, the upper part of each circuit pattern 12 of the tape-like substrate 11 is supplied by cutting section 23c so that IC chip joint 13 in each circuit pattern 12 of the tape-like substrate 11 can be supplied. Then, by being pressurized while a cementing material 21 is heated by heating / pressurization tool 24 to IC chip joint 13 of each circuit pattern 12 in the tape-like substrate 11, as shown in drawing 5 (c) and (d), attachment supply is carried out and the protection sheet 22 which had protected another field of a cementing material 21 is attracted by the sheet suction section 27. Then, adsorption on the stage 20 of the tape-like substrate 11 is canceled.

[0034] Here, as shown in drawing 5 (e), when a cementing material 21 is the paste-like cementing material 25, it replaces with attachment of the above-mentioned cementing material 21, and spreading supply is carried out by the dispenser 26 to IC chip joint 13 of each circuit pattern 12 in the tape-like substrate 11.

[0035] Next, after each circuit pattern 12 of the tape-like substrate 11 was sent from IC chip mounting previous work business section 2 to IC chip mounting activity section 3a which is the 1st activity section in IC chip mounting activity section 3 of drawing 2 (a), In IC chip mounting activity section 3a, adsorption maintenance of the tape-like substrate 11 which has each circuit pattern 12 with which the cementing material 21 was stuck is carried out by being drawn in in the adsorption hole of stage 30a at stage 30a.

[0036] Next, as shown in drawing 6 (a), bump 31b is formed in two or more electrode 31a of the top face of the IC chip 31 of Au which is an electrical conducting material. In drawing 2 (a), the IC chip 31

is picked out from the components tray 32, the alignment array being carried out into the components tray 32, and the pars inflexa 33 moving above the components tray 32 by motor 33a for Y directional movements of built-in in the pars inflexa 33, and carrying out adsorption maintenance of the IC chip 31 by the adsorption nozzle of the pars inflexa 33, and the pars inflexa 33 returns to the original location, with the adsorption maintenance of the IC chip 31 carried out.

[0037] Next, so that the field in which each bump 31b of the IC chip 31 was formed may serve as facing down After reversing the IC chip 31 by motor 33b for reversal of the pars inflexa 33, While the pars inflexa 33 had carried out adsorption maintenance of the IC chip 31 by motor 33c for X directional movements of built-in in the pars inflexa 33, it moves under the tool 34, and as shown in drawing 6 (b), adsorption maintenance is carried out, and the IC tip 31 is received and passed to the pressurization and the heating unit of the inferior surface of tongue of a tool 34.

[0038] Then, while the pars inflexa 33 returns from the lower part of a tool 34 to the original location The IC chip 31 is moved to a tool 34 onto the tape-like substrate 11 by motor 34a for Y directional movements of a tool 34, while adsorption maintenance had been carried out. So that each bump 31b of the IC chip 31 and each electrode 13a of the IC joint 13 of each circuit pattern 12 in the tape-like substrate 11 can be joined After carrying out alignment of the IC chip 31 to each circuit pattern 12 in the tape-like substrate 11, as shown in drawing 6 (c) and (d) It is pressurized heating with a tool 34 and temporary sticking by pressure of the IC chip 31 is carried out at the cementing material 21 stuck on IC chip joint 13 of each circuit pattern 12 in the tape-like substrate 11. Then, a tool 34 is returned to the original location and the adsorption to stage 30a of the tape-like substrate 11 is canceled.

[0039] Next, after each circuit pattern 12 of the tape-like substrate 11 was sent from IC chip mounting activity section 3a to IC chip book sticking-by-pressure activity section 3b which is the 2nd activity section in IC chip mounting activity section 3 of drawing 2 (a), In IC chip book sticking-by-pressure activity section 3b, adsorption maintenance of the tape-like substrate 11 which has each circuit pattern 12 with which temporary sticking by pressure of the IC chip was carried out is carried out by being drawn in in the adsorption hole of stage 30b at stage 30b.

[0040] Next, as shown in drawing 7 (a), heating / pressurization tool 35 for carrying out actual sticking by pressure of the IC chip 31 by which temporary sticking by pressure was carried out is prevented from the dirt at the time of heating and pressurization with the protection sheet 36 in the inferior surface of tongue which is heating / pressurization side, and the always pure condition is maintained at the cementing material 21 supplied on the tape-like substrate 11.

[0041] By the motors 35a and 35b for XY directional movements of heating / pressurization tool 35 As heating / pressurization tool 35 is moved onto the tape-like substrate 11 and it is shown in drawing 7 (b) By being pressurized while the top face of the IC chip 31 by which temporary sticking by pressure was carried out is heated with heating / pressurization tool 35 by the cementing material 21 supplied on the tape-like substrate 11 It is pushed away by the cementing material 21 between each bump 31b of the IC chip 31, and each electrode 13a of IC chip joint 13 of each circuit pattern 12 of the tape-like substrate 11. Each bump 31b of the IC chip 31 is directly joined to each electrode 13a of IC chip joint 13 of each circuit pattern 12 in the tape-like substrate 11. Then, a cementing material 21 will heat-harden and junction of the IC chip 31 and the tape-like substrate 11 will be maintained. Then, heating / pressurization tool 35 is returned to the original location, and the adsorption to stage 30b of the tape-like substrate 11 is canceled.

[0042] As it replaces with a non-conductive resin ingredient, and the metal which is the resin ingredient containing a conductive particle, a conductive resin ingredient, or a conductive ingredient may be used for a cementing material 21 here, for example, it is shown in drawing 7 (d) When a cementing material 21 is the anisotropy electric conduction film containing conductive particle 21a When the top face of the IC chip 31 by which temporary sticking by pressure was carried out is pressurized by the cementing material 21 supplied on the tape-like substrate 11 The cementing material 21 between each bump 31b of the IC chip 31 and each electrode 13a of IC chip joint 13 of each circuit pattern 12 is pressurized, and conductive particle 21a in this part of a cementing material 21 is minded. Each bump 31b of the IC chip 31 and each electrode 13a of IC chip joint 13 of each circuit pattern 12 of the tape-like substrate 11 are

joined indirectly.

[0043] Moreover, each electrode 31a of the IC chip 31 and each electrode 13a of IC chip joint 13 of each circuit pattern 12 in the tape-like substrate 11 The ** which replaces with the junction approach by the above-mentioned cementing material 21, and does not use a cementing material 21, Metal diffusion junction by the supersonic wave may be given to each electrode 31a of the IC chip 31 and each electrode 13a of each circuit pattern 12 which were mutually formed with the metallic material, and the metal diffusion junction approach of mounting the IC chip 31 in the tape-like substrate 11 may be used.

[0044] Next, after each circuit pattern 12 of the tape-like substrate 11 is sent from IC chip mounting activity section 3 to the chip component-mounting previous work business section 4 of drawing 3, it sets to the solder feed zone 41 of the chip component-mounting previous work business section 4. As shown in drawing 8, adsorption maintenance of the tape-like substrate 11 which has each circuit pattern 12 with which the IC chip 31 was mounted is carried out by being drawn in by adsorption hole 42a of a stage 42 on a stage 42.

[0045] Drop the metal mask 43 on the tape-like substrate 11, and on each electrode 14a of two or more chip joints 14 of each circuit pattern 12 in the tape-like substrate 11 next, two or more opening 43a for solder supply of the plate-like metal mask 43 From each opening 43 for solder supply a, alignment is carried out so that supply of the cream solder 44 may be possible on each electrode 14a of each chip joint 14, and the metal mask 43 is installed on the tape-like substrate 11.

[0046] Next, by making it move, while applying the tip of a squeegee 45 to the top face of the metal mask 43 by the motors 45a and 45b for XY directional movements and letting it slide, each opening 43a for solder supply is filled up with the cream solder 44, and printing supply of the cream solder 44 is carried out on electrode 14a of the chip joint 14 of each circuit pattern 12 in the tape-like substrate 11. Then, the metal mask 43 on the tape-like substrate 11 is moved up, and adsorption of a stage 42 is canceled.

[0047] Although the supply to each electrode 14a of two or more chip joints 14 of each circuit pattern 12 in the tape-like substrate 11 of the cream solder 44 does not carry out illustration, it may be replaced with the metal mask 43 and a squeegee 45 here, and spreading supply may be carried out by using a dispenser.

[0048] Moreover, the cream solder 44 may be an example of a cementing material 44, and may be the solder which replaces a cementing material 44 with the cream solder 44, and does not contain lead, metals, such as an alloy of Au and Sn, or conductive resin.

[0049] Next, in the chip component-mounting activity section 5, after each circuit pattern 12 of the tape-like substrate 11 is sent from the chip component-mounting previous work business section 4 to the chip component-mounting activity section 5 of drawing 3, as shown in drawing 9, adsorption maintenance of the tape-like substrate 11 which has each circuit pattern 12 with which the cream solder 44 was printed is carried out by being drawn in by adsorption hole 55a of a stage 55 on a stage 55.

[0050] Next, a head 53 is moved in the XY direction by the motors 53a and 53b for XY directional movements of a head 53, a chip 51 is picked out from the parts cassette 52 to the parts cassette 52 by which two or more chips 51 which have two or more electrode 51a are stored, and it is made to move a chip 51 with a head 53 onto the tape-like substrate 11 in drawing 3 by carrying out adsorption maintenance of the chip 51 with the adsorption nozzle 54 of a head 53. Furthermore, as shown in drawing 9, each electrode 51a of a chip 51 is mounted through the cream solder 44 printed on each electrode 14a of each chip joint 14 of each circuit pattern 12 in the tape-like substrate 11. Then, a head 53 is returned to the original location and, as for the tape-like substrate 11, adsorption on a stage 55 is canceled.

[0051] Next, in the chip reflow activity section 6, after each circuit pattern 12 of the tape-like substrate 11 is sent from the chip component-mounting activity section 5 to the chip reflow activity section 6 of drawing 3, as shown in drawing 10, adsorption maintenance of the tape-like substrate 11 with which each chip 51 was mounted is carried out by being drawn in by adsorption hole 63a of a stage 63 on a stage 63.

[0052] Next, each electrode 51a of a chip 51 and each electrode 14a of each chip joint 14 of each circuit

pattern 12 in the tape-like substrate 11 are joined by fusing the cream solder 44 printed by each electrode 14a of each chip joint 14 of each circuit pattern 12 with which each chip 51 was mounted, and which can be set tape-like substrate 11, and cooling and solidifying it using the heat source 61 of a light beam, a heater, etc. Then, adsorption on the stage 63 of the tape-like substrate 11 is canceled.

[0053] In order the heat from a heat source 61 is already in charge of the IC chip 31 mounted on each circuit pattern 12 in the tape-like substrate 11 at this time and not to reduce the junction quality of the IC chip 31 and the tape-like substrate 11. The whole top face of the IC chip 31 can be covered with the shield 62 formed so that it might be possible to cover the whole top face of the IC chip 31 joined on the circuit pattern 12, and the IC chip 31 can also be covered from the heat of a heat source 61.

[0054] Furthermore, opening section 63b is provided as a thermal break between the tape-like substrates 11 in the top face of a stage 63 so that the tape-like substrate 11 heated according to the heat source 61 cannot radiate heat easily.

[0055] Moreover, distortion of the tape-like substrate 11 grade by heat can be lessened by cooling the tape-like substrate 11 heated in the chip reflow activity section, and the mounted chip 51 by an air blow etc.

[0056] In the tape [after each circuit pattern 12 of the tape-like substrate 11 was finally sent from the chip reflow activity section 6 to the tape-like substrate winding activity section 7 of drawing 3]-like substrate winding activity section 7 It rolls round intermittently to a reel 71 by carrying out intermittent rotation of the reel 71 attached in tape stowage 7a in the tape-like substrate 11 cooled by the air blow etc. using the motor 72 for tape-like substrate winding where the IC chip 31 and a chip 51 are mounted.

[0057] When the tape-like substrate 11 with which the IC chip 31 and the chip 51 were mounted is rolled round by the reel 71 here, so that the IC chip 31 and a chip 51 may not contact the tape-like substrate 11 and directly After being crowded on both sides of the letter spacer 73 of embossing of the shape of a sheet which has the concave heights which can protect the IC chip 31 and a chip 51 and protecting each part article before the tape-like substrate 11 is rolled round as shown in drawing 1111 , the tape-like substrate 11 is rolled round to a reel 71.

[0058] In addition, if in charge of mounting of a chip 51, you may mount by replacing with the mounting approach by the reflow of the solder in the above, and giving heating and pressurization like the mounting approach of the IC chip 31, using a conductive resin metallurgy group as a cementing material.

[0059] Moreover, in the tape-like substrate winding activity section 7, where the IC chip 31 and a chip 51 are mounted Where it replaced the tape-like substrate 11 with rolling round to a reel 71 and the IC chip 31 and a chip 51 are mounted You may be the case where it is taken out on a tray etc., using as each circuit board each circuit pattern 12 which pierced each circuit pattern 12 in the tape-like substrate 11 from the tape-like substrate 11, and was pierced according to the individual.

[0060] Next, the control network of the mounting equipment 101 for doing each of a series of activity in each above-mentioned activity section is explained. Drawing 12 is the control schematic diagram of mounting equipment 101. Motion control of the motor 16 for tape-like substrate rewinding and the motor 72 for winding is carried out by the mounting equipment Maine control section. Furthermore, each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6 has the sub control section for every activity section, and motion control of the non-control sections, such as each motor of each activity circles, is carried out by each of these sub control sections. Furthermore, also from the Maine control section, intensively, all of each of these sub control sections are associated so that supervisory control may be possible.

[0061] Moreover, in a mounting equipment Maine control section, motion control of the delivery of the tape-like substrate 11 is carried out, and it sets in each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6. If each predetermined activity in the activity section concerned is performed to each circuit pattern 12 of the tape-like substrate 11 and adsorption immobilization of a up to [each stage of the tape-like substrate 11] is canceled in each above-mentioned activity section The discharge signal of each activity section is sent to the Maine control section from each sub control section, and the Maine control section receives each discharge

signal in all the above-mentioned activity sections from each sub control section. Then, a rotation actuating signal will be sent from the Maine control section to the motor 16 for tape-like substrate rewinding, and the motor 72 for winding, and when the motor 16 for tape-like substrate rewinding and the motor 72 for winding rotate, it will be sent that each circuit pattern 12 on the tape-like substrate 11 is also at a pitch P. Therefore, in each activity section, adsorption immobilization of the tape-like substrate 11 is carried out, and a predetermined activity in the activity section concerned is performed for one circuit pattern 12 on the tape-like substrate 11. After adsorption immobilization of the tape-like substrate 11 is canceled in all the activity sections, while it is sent to the following activity section that the circuit pattern 12 to which the activity in the activity section concerned was performed is also at a pitch P, the circuit pattern 12 with which the activity in the activity section concerned is not performed in each activity section is supplied.

[0062] Moreover, when the trouble which cannot perform discharge of the adsorption immobilization to up to each stage of the tape-like substrate 11 in each above-mentioned activity section occurs, from the sub control section of the activity section concerned, the discharge signal of adsorption immobilization will be sent to the Maine control section, can make delivery of the tape-like substrate 11 a standby condition in the Maine control section, and can also emit a trouble alarm etc. to the Maine control section if needed.

[0063] Moreover, in each activity section, since it is necessary to recognize correctly each part article mounting position of each circuit pattern 12 formed succeeding the tape-like circuit board 11 top, it has the mounting position recognition section which recognizes the mounting position of each part article in each activity section by recognizing each part article mounting position of each circuit pattern 12 directly, or using the partial configuration of each circuit pattern 12, and recognizing the configuration.

[0064] Furthermore, when the defect circuit pattern is contained in the circuit pattern 12 in the tape-like substrate 11, it is possible to make the defect circuit pattern skip in each activity section based on the mapping data of each circuit pattern 12 in the tape-like substrate 11.

[0065] Moreover, it becomes possible by carrying out adjustable [of the spacing between each activity section of a before / the chip reflow activity section 6 / from IC chip mounting previous work business section 2] to the multiple of the pitch P of each circuit pattern 12 of the tape-like substrate 11 by data control to correspond to the configuration of various circuit patterns.

[0066] Next, in case the tape-like substrate 11 is processed with mounting equipment 101, the stop time t of intermittent delivery of the tape-like substrate 11 is explained. The time amount which each activity in each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6 takes IC chip mounting activity section 3a in IC chip mounting previous work business section 2t2 and IC chip mounting activity section 3 sets to t3a, and IC chip book sticking-by-pressure activity section 3b sets it as t3b, the chip component-mounting previous work business section 4t4, the chip component-mounting activity section 5t5, and the chip reflow activity section 6t6. Then, it is necessary to carry out the stop time t of intermittent delivery of the tape-like substrate 11 to more than the maximum tmax of the time amount t2-t6 which each activity in each activity section takes, and it will be determined by Maximum tmax.

[0067] Moreover, it sets in IC chip book sticking-by-pressure activity section 3b or the chip reflow activity section 6. Since the heating time for mounting the IC chip 31 and a chip 51 in each circuit pattern 12 is needed, Time amount t3b which each activity in IC chip book sticking-by-pressure activity section 3b or the chip reflow activity section 6 takes, or t6 Although it becomes the maximum tmax of the time amount t2-t6 which each activity in each activity section takes in many cases, it sets in the chip component-mounting activity section 5, for example. When a large number [the chip 51 mounted] The time amount t5 which the activity in the chip component-mounting activity section 5 takes becomes larger than time amount t3b which each activity kicked in IC chip book sticking-by-pressure activity section 3b and the chip reflow activity section 6 takes, and t6. There is a case so that it may become the maximum tmax of the time amount t2-t6 which each activity in each activity section takes. In such a case, it sets in the activity section applicable to the maximum tmax of the time amount t2-t6 which each activity in each activity section takes. The time amount which the activity concerned in the activity

section concerned takes by dividing a routing into two division etc. is divided similarly. Becoming small, the maximum t_{max1} of the time amount t2-t6 which each activity in each activity section after routing division takes serves as working hours used as the max of the time amount which each activity in each activity section takes also including the time amount which the activity in the activity section concerned after the routing was divided takes. Therefore, maximum t_{max1} can be made smaller than Maximum t_{max} , and can shorten the stop time t of intermittent delivery of the tape-like substrate 11. [0068] Moreover, electronic-parts mounting equipment 101 mounts the chip 51, after being constituted in order of each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6 and mounting the IC chip 31, but after a chip 51 is mounted, it may constitute each activity section so that the IC chip 31 may be mounted.

[0069] In addition, in this operation gestalt, although the mounting approach of the electronic parts to the tape-like substrate 11 with which the same circuit pattern 12 is continuously formed with the fixed spacing pitch P was explained, as long as the circuit pattern 12 is continuously formed in the tape-like substrate 11 with the fixed spacing pitch P, each circuit pattern 12 may not be the same and may be somewhat different.

[0070] According to the operation gestalt of the above 1st, the following effectiveness can be acquired.

[0071] Conventionally, the buffer section of a substrate was prepared for every activity section in mounting equipment, and the substrate which packed the substrate processed in each activity section by the fixed volume unit, and was processed after the substrate of a fixed volume unit collected on each buffer section in delivery and each buffer section was sent to the following activity section. However, the tape-like substrate 11 formed so that the same circuit pattern 12 might continue with the pitch P of fixed spacing is used. Supply this tape-like substrate 11 to each activity section of mounting equipment 101, and a predetermined activity is performed to the tape-like substrate 11 in each activity section. By rolling round the tape-like substrate 11 with which the activity was performed, synchronizing supply and the winding activity of the tape-like substrate 11, and performing them intermittently [of a parenthesis] In each activity section which adjoins mutually [from supply of the tape-like substrate 11 before rolling up], it will let the one tape-like substrate 11 pass, and the tape-like substrate 11 will be sent intermittently.

[0072] Furthermore, whenever an activity predetermined in one circuit pattern 12 on the tape-like substrate 11 with each activity section is performed by sending the one tape-like substrate 11 to each activity section which adjoins mutually intermittently, it is sent to the following activity section that the circuit pattern 12 which worked is also at a pitch P. The circuit pattern 12 with which the activity in the activity section concerned is not performed in each activity section with it will be supplied. Therefore, in each activity section, since each predetermined activity will be repeated intermittently, the buffer section of a substrate becomes unnecessary and it becomes possible to make size of mounting equipment small.

[0073] Moreover, it sets to the mounting equipment of the conventional electronic parts of a case so that substrate delivery may be started to mounting equipment. Until it is discharged from each activity section and fixed volume unit conclusion ***** is sent to the following activity section in each activity section in mounting equipment, after the mounting activity of electronic parts is performed to all the substrates of a fixed volume unit In the following activity section, it is in the state waiting for processing of a substrate, and there was a time amount loss of substrate delivery. However, whenever it supplies this tape-like substrate 11 to mounting equipment 101 and an activity predetermined in one circuit pattern 12 with each activity section is performed using the tape-like substrate 11 formed so that the same circuit pattern 12 might continue, it is sent to the following activity section that the circuit pattern 12 with which the activity was performed is also at a pitch P. The circuit pattern 12 with which the activity in the activity section concerned is not performed in each activity section with it will be supplied. Therefore, in each activity section, repeatedly, each predetermined activity can be performed to a substrate, the time amount loss of substrate delivery can be shortened, and it becomes possible intermittently to aim at reduction of mounting cost. Furthermore, an operating ratio can be gathered in each activity section, and it becomes possible to raise productivity.

[0074] Moreover, in the mounting approach of the electronic parts using the substrate of the

conventional piece of an individual, since the predetermined activity in delivery and the activity section concerned was performed for the substrate of the piece of an individual to each activity section, the substrate was discharged from the activity section concerned and it was carrying out by repeating these activities, it was difficult to fixed-ize the delivery location of the substrate of the piece of each in each activity section. However, by being formed so that the circuit pattern 12 may continue with the fixed spacing pitch P on the tape-like substrate 11. Beforehand each circuit pattern 12 by being positioned on the tape-like substrate 11 and sending that it is also at a pitch P about the one tape-like substrate 11. Since the delivery location of each circuit pattern 12 can be fixed-sized more in each activity section, it becomes possible to raise working efficiency.

[0075] Moreover, mounting equipment 101 is equipped with the mounting equipment Maine control section which carries out motion control of the motor 16 for tape-like substrate rewinding, and the motor 72 for winding, and the sub control section which carries out motion control of the non-control sections, such as each motor of each activity circles, for each [from IC chip mounting previous work business section 2 to the chip reflow activity section 6] activity section of every, and also from the Maine control section, intensively, all of each of these sub control sections are associated so that supervisory control may be possible. This sets in each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6. If each predetermined activity in the activity section concerned is performed to each circuit pattern 12 of the tape-like substrate 11 and adsorption immobilization of a up to [each stage of the tape-like substrate 11] is canceled in each above-mentioned activity section after adsorption immobilization of the tape-like substrate is carried out. The discharge signal of each activity section will be sent to the Maine control section from each sub control section, and the Maine control section will receive the discharge signal in all the above-mentioned activity sections from each sub control section. Then, a rotation actuating signal will be sent from the Maine control section to the motor 16 for tape-like substrate rewinding, and the motor 72 for winding, and when the motor 16 for tape-like substrate rewinding and the motor 72 for winding rotate, it will be sent that each circuit pattern 12 on the tape-like substrate 11 is also at a pitch P. Therefore, in each activity section, adsorption immobilization of the tape-like substrate 11 is carried out, and a predetermined activity in the activity section concerned is performed to one circuit pattern 12 on the tape-like substrate 11. After adsorption immobilization of the tape-like substrate 11 is canceled in all the activity sections, while it is sent to the following activity section that the circuit pattern 12 to which the activity in the activity section concerned was performed is also at a pitch P. The circuit pattern 12 with which the activity in the activity section concerned is not performed in each activity section will be supplied, and the motion control of intermittent delivery of the tape-like substrate 11 becomes possible. [0076]

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PRIOR ART

[Description of the Prior Art] Conventionally, mounting to the substrate of electronic parts, such as IC chip and a chip, packed the substrate of the piece of an individual fixed quantity every, and delivery and after that, the band conveyor etc. performed the substrate of the piece of an individual, and it was performing one flow junction of the electrode of electronic parts, and the electrode of a substrate at a time to each routing in mounting equipment in the predetermined activity location in each process by supply of delivery and a cementing material, mounting of electronic parts, heating, pressurization of a cementing material, etc.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] According to the 1st mode of the above of this invention, the time amount loss of substrate delivery is shortened and it becomes possible to aim at reduction of mounting cost, and further, the operating ratio of mounting equipment is gathered and it becomes possible to raise productivity.

[0088] In the location where the mounting activity of two or more electronic parts is done in the mounting approach of the conventional electronic parts The substrate of the piece of an individual is packed into a fixed volume unit, and the one above-mentioned substrate is sent at a time out of the substrate of the amount unit of number of top [this] Norikazu. While each above-mentioned substrate with which the mounting activity of each above-mentioned electronic parts was performed to each above-mentioned substrate, and the above-mentioned mounting activity was performed is packed and sent out to a fixed volume unit These activities of another above-mentioned substrate with which the above-mentioned mounting activity is not performed having been packed into a fixed volume unit, and being supplied again were repeated. Therefore, there was a time amount loss of substrate delivery in the activity supplied after packing the substrate of the above-mentioned piece of an individual, and the activity taken out after collecting.

[0089] However, it sets to the mounting approach of the electronic parts by the 1st mode of the above of this invention. The tape-like substrate formed so that a circuit pattern might continue with the pitch of fixed spacing is used. Intermittently this above-mentioned tape-like substrate of one by mounting each above-mentioned electronic parts in each above-mentioned circuit pattern of the above-mentioned tape-like substrate at the time of a halt of delivery and intermittent delivery of the above-mentioned tape-like substrate In the location where the mounting activity of each above-mentioned electronic parts is done whenever the mounting activity of each above-mentioned electronic parts is performed to one circuit pattern on the above-mentioned tape-like substrate That the one above-mentioned circuit pattern to which the above-mentioned mounting activity was performed is also at the pitch of fixed spacing being sent out, it will be supplied that one another circuit pattern with which the above-mentioned mounting activity is not performed is also at the pitch of fixed spacing, and these activities will be repeated.

[0090] Therefore, the activity of packing a substrate into a fixed volume unit can be abolished, the time amount loss of substrate delivery can be shortened, and it becomes possible to aim at reduction of mounting cost. Furthermore, the operating ratio of mounting equipment can be gathered and it becomes possible to raise productivity.

[0091] Moreover, in the mounting approach of the conventional electronic parts, since the substrate of the above-mentioned piece of an individual would be sent to the location where the mounting activity of each above-mentioned electronic parts is done, in the location where the mounting activity of each above-mentioned electronic parts is done, it also had the trouble that it was difficult to fixed-ize the delivery location of the substrate of the above-mentioned piece of each. However, by being formed so that the above-mentioned circuit pattern may continue with a fixed spacing pitch on the above-mentioned tape-like substrate Beforehand each above-mentioned circuit pattern by being positioned on the above-mentioned tape-like substrate and sending that it is also at a fixed spacing pitch about the

above-mentioned tape-like substrate of one In the location where the mounting activity of each above-mentioned electronic parts is performed, since the delivery location of each above-mentioned circuit pattern can be fixed-ized more, it becomes possible to raise working efficiency.

[0092] According to the 2nd mode of the above of this invention, the time amount loss of substrate delivery is shortened and it becomes possible to aim at reduction of mounting cost, and further, the operating ratio of mounting equipment is gathered and it becomes possible to raise productivity.

[0093] In the mounting approach of the conventional electronic parts of a case so that substrate delivery may be started Until it is discharged from each above-mentioned routing, it is collected into a fixed volume unit at the following above-mentioned routing and the above-mentioned substrate is sent in each routing, after the mounting activity of each electronic parts is performed to all the substrates of a fixed volume unit In this following above-mentioned routing, it is in the state waiting for an activity of the above-mentioned substrate, and there was a time amount loss of substrate delivery.

[0094] However, it sets to the mounting approach of the electronic parts by the 2nd mode of the above of this invention. The above-mentioned tape-like substrate formed so that the above-mentioned circuit pattern might continue with the pitch of fixed spacing is used. Intermittently this above-mentioned tape-like substrate of one by mounting each above-mentioned electronic parts in each above-mentioned circuit pattern of the above-mentioned tape-like substrate at the time of a halt of delivery and intermittent delivery of the above-mentioned tape-like substrate That the above-mentioned circuit pattern with which the above-mentioned activity was performed is also at a fixed spacing pitch being sent to the following routing, whenever an activity predetermined by each above-mentioned routing is performed to the one above-mentioned circuit pattern on the above-mentioned tape-like substrate The one another above-mentioned circuit pattern with which the activity by the routing concerned is not performed in each above-mentioned routing will be supplied, and these activities will be repeated.

[0095] Therefore, in each above-mentioned routing, the activity of packing a substrate into a fixed volume unit can be abolished, the time amount loss of substrate delivery can be shortened, and it becomes possible to aim at reduction of mounting cost. Furthermore, an operating ratio can be gathered in each routing and it becomes possible to raise productivity.

[0096] Moreover, in the mounting approach of the conventional electronic parts, since the substrate of the above-mentioned piece of each would be sent to each above-mentioned mounting routing of each above-mentioned electronic parts, it also had the trouble that it was difficult to fixed-ize the delivery location of the substrate of the above-mentioned piece of each in each above-mentioned routing. However, by being formed so that the above-mentioned circuit pattern may continue with a fixed spacing pitch on the above-mentioned tape-like substrate Beforehand each above-mentioned circuit pattern by being positioned on the above-mentioned tape-like substrate and sending that it is also at a fixed spacing pitch about an one above-mentioned tape-like substrate Since the delivery location of each above-mentioned circuit pattern can be fixed-ized more in each above-mentioned routing, it becomes possible to raise working efficiency.

[0097] Since the various mounting approaches to the substrate of IC chip used or a chip are applicable in each above-mentioned routing conventionally also in the mounting approach of the electronic parts to the tape-like substrate concerning this invention according to the 3-10th modes of the above of this invention, it becomes possible to offer the mounting approach of electronic parts with high versatility.

[0098] According to the 11th mode of the above of this invention, the buffer section of a substrate can be made unnecessary, and while becoming possible to make size of mounting equipment small, the time amount loss of substrate delivery is shortened, and it becomes possible to aim at reduction of mounting cost, and further, the operating ratio of mounting equipment is gathered and it becomes possible to raise productivity.

[0099] In the mounting activity section which prepares the buffer section of a substrate in mounting equipment, and mounts two or more electronic parts in the mounting equipment of the conventional electronic parts The substrate of the piece of an individual is packed into a fixed volume unit in the above-mentioned buffer section, and the one above-mentioned substrate is supplied at a time to the above-mentioned mounting activity section out of the substrate of the amount unit of number of above-

mentioned buffer section top Norikazu. While each above-mentioned substrate with which the mounting activity of each above-mentioned electronic parts was performed to each above-mentioned substrate, and the above-mentioned mounting activity was performed is packed and sent out to a fixed volume unit in the above-mentioned buffer section. These activities that another above-mentioned substrate with which the above-mentioned mounting activity is not performed was packed into a fixed volume unit, and the above-mentioned buffer section was supplied again were repeated. Therefore, the above-mentioned buffer section for packing the substrate of the above-mentioned piece of an individual is required, and there was a time amount loss of substrate delivery further in the activity supplied after packing the substrate of the above-mentioned piece of an individual, and the activity taken out after collecting.

[0100] However, it sets to the mounting equipment of the electronic parts by the 11th mode of this invention. The tape-like substrate formed so that a circuit pattern might continue with the pitch of fixed spacing is used. Intermittently this above-mentioned tape-like substrate of one in the electronic-parts mounting activity section Delivery, By mounting each above-mentioned electronic parts in each above-mentioned circuit pattern of the above-mentioned tape-like substrate in the above-mentioned electronic-parts mounting activity section at the time of a halt of intermittent delivery of the above-mentioned tape-like substrate. Whenever the mounting activity of each above-mentioned electronic parts is performed to one circuit pattern on the above-mentioned tape-like substrate, it sets in the above-mentioned electronic-parts mounting activity section. That the one above-mentioned circuit pattern to which the above-mentioned mounting activity was performed is also at the pitch of fixed spacing being sent out, it will be supplied that one another circuit pattern with which the above-mentioned mounting activity is not performed is also at the pitch of fixed spacing, and these activities will be repeated.

[0101] Therefore, while being able to abolish the activity of packing a substrate into a fixed volume unit, the above-mentioned buffer section of the substrate for packing a substrate into a fixed volume unit can be made unnecessary. Therefore, while becoming possible to make size of mounting equipment small, the time amount loss of substrate delivery can be shortened and it becomes possible to aim at reduction of mounting cost. Furthermore, the operating ratio of mounting equipment can be gathered and it becomes possible to raise productivity.

[0102] Moreover, in the mounting equipment of the conventional electronic parts, since the substrate of the above-mentioned piece of an individual would be sent to the above-mentioned electronic-parts mounting activity section, in the above-mentioned electronic-parts mounting activity section, it also had the trouble that it was difficult to fixed-ize the delivery location of the substrate of the above-mentioned piece of each. However, by being formed so that the above-mentioned circuit pattern may continue with a fixed spacing pitch on the above-mentioned tape-like substrate. Beforehand each above-mentioned circuit pattern by being positioned on the above-mentioned tape-like substrate and sending that it is also at a fixed spacing pitch about the above-mentioned tape-like substrate of one. In the above-mentioned electronic-parts mounting activity section, since the delivery location of each above-mentioned circuit pattern can be fixed-ized more, it becomes possible to raise working efficiency.

[0103] According to the 12th mode of the above of this invention, the buffer section of a substrate can be made unnecessary, and while becoming possible to make size of mounting equipment small, the time amount loss of substrate delivery is shortened, and it becomes possible to aim at reduction of mounting cost, and further, the operating ratio of mounting equipment is gathered and it becomes possible to raise productivity.

[0104] In the mounting equipment of the conventional electronic parts, the buffer section of a substrate was prepared for every activity section, and the substrate which packed the substrate processed in each activity section by the fixed volume unit, and was processed after the substrate of a fixed volume unit collected on each above-mentioned buffer section in delivery and each above-mentioned buffer section was sent to the following activity section. Therefore, the buffer section for packing the substrate of the above-mentioned piece of an individual was required, it was discharged from each above-mentioned activity section, and after the mounting activity of each electronic parts was performed to the substrate of the above-mentioned piece of an individual, it is in the state waiting for an activity of the above-

mentioned substrate, and the time-amount loss of substrate delivery was in this following above-mentioned activity section further until it was collected into the fixed volume unit and the above-mentioned substrate was sent to the following above-mentioned activity section.

[0105] However, it sets to the mounting equipment of the electronic parts by the 12th mode of the above of this invention. The above-mentioned tape-like substrate formed so that the above-mentioned circuit pattern might continue with the pitch of fixed spacing is used. This above-mentioned tape-like substrate of one by mounting [intermittently] each above-mentioned electronic parts in each above-mentioned circuit pattern of the above-mentioned tape-like substrate in each above-mentioned activity section at the time of a halt of delivery and intermittent delivery of the above-mentioned tape-like substrate in each activity section. That the above-mentioned circuit pattern with which the above-mentioned activity was performed is also at a fixed spacing pitch being sent to the following activity section, whenever an activity predetermined in each above-mentioned activity section is performed to the one above-mentioned circuit pattern on the above-mentioned tape-like substrate. The one another above-mentioned circuit pattern with which the activity in the activity section concerned is not performed in each above-mentioned activity section will be supplied, and these activities will be repeated.

[0106] Therefore, while being able to abolish the activity of packing a substrate into a fixed volume unit, in each above-mentioned activity section, the above-mentioned buffer section of the substrate for packing a substrate into a fixed volume unit can be made unnecessary. Therefore, while becoming possible to make size of mounting equipment small, the time amount loss of substrate delivery can be shortened and it becomes possible to aim at reduction of mounting cost. Furthermore, the operating ratio of mounting equipment can be gathered and it becomes possible to raise productivity.

[0107] Moreover, in the mounting equipment of the conventional electronic parts, since the substrate of the above-mentioned piece of each would be sent to each above-mentioned mounting activity section of each above-mentioned electronic parts, it also had the trouble that it was difficult to fixed-ize the delivery location of the substrate of the above-mentioned piece of each in each above-mentioned activity section. However, by being formed so that the above-mentioned circuit pattern may continue with a fixed spacing pitch on the above-mentioned tape-like substrate. Beforehand each above-mentioned circuit pattern by being positioned on the above-mentioned tape-like substrate and sending that it is also at a fixed spacing pitch about an one above-mentioned tape-like substrate. Since the delivery location of each above-mentioned circuit pattern can be fixed-ized more in each above-mentioned activity section, it becomes possible to raise working efficiency.

[0108] Since rewinding and rolling up of a reel can perform supply and rolling up of a tape-like substrate and the above-mentioned tape-like substrate can carry out supply initiation and the completion of a rolling-up activity only in attachment and detachment of the above-mentioned reel to a tape-like substrate feed zone and the tape-like substrate rolling-up section according to the 13th mode of this invention of the above, while becoming that it is possible to make mounting equipment size small, it becomes that it is possible in carrying out easily supply and a rolling-up activity of the above-mentioned tape-like substrate.

[0109] According to the 14th mode of the above of this invention, conventionally, since it corresponded to the substrate of various configurations in mounting equipment, the buffer section of the substrate between each activity section needed to be enlarged, or the buffer section needed to be exchanged according to the configuration of a substrate. However, since it can respond to the pitch of each above-mentioned circuit pattern on the above-mentioned tape-like substrate and can carry out adjustable [of the spacing between each activity section of a before / the chip reflow activity section / from IC chip mounting previous work business section] to the multiple of the above-mentioned pitch by data control, it becomes possible to correspond to the configuration of the various above-mentioned circuit patterns only by adjustment of a setup of the above-mentioned data control.

[0110] According to the 15th mode of the above of this invention, it sets in the tape-like substrate winding activity section. Before the tape-like substrate with which each electronic parts are mounted is rolled round, after covering and protecting each above-mentioned electronic parts with the letter spacer of embossing of the shape of a sheet which has the concave heights which can protect each above-

mentioned electronic parts. Since it is lost that each above-mentioned electronic parts contact the above-mentioned tape-like substrate and directly when the above-mentioned tape-like substrate is rolled round by the above-mentioned reel by rolling round the above-mentioned tape-like substrate to a reel with the above-mentioned spacer, A mounting position gap of each above-mentioned electronic parts etc. can be prevented, and it becomes possible to prevent deterioration of the junction quality of each above-mentioned electronic parts.

[0111] According to the 16th mode of the above of this invention, it sets in the chip reflow activity section. After mounting a chip indirectly on a tape-like substrate by melting of cream solder, where it cooled the tape-like substrate with above-mentioned having held heat by the air blow etc. and distortion of the above-mentioned tape-like substrate by heat is lessened By rolling round the above-mentioned tape-like substrate in the above-mentioned tape-like substrate winding activity section, it becomes possible in the tape-like substrate winding activity section to roll round, after distortion has decreased in the above-mentioned tape-like substrate, and to roll round smoothly.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in the thing of the above-mentioned structure, in order to lessen the time amount loss of substrate delivery by the difference in the working hours in each process in mounting equipment The substrate which prepared the buffer section of a substrate for every routing in mounting equipment, and was processed in each process in each buffer section Delivery, Since the substrate collectively processed by the fixed volume unit was sent to the following routing after the substrate of a fixed volume unit collects in each buffer section, there was a problem that equipment size became large. Moreover, in each routing in equipment, in the following process, it is in the state waiting for processing of a substrate, and there was a trouble that the time amount loss of substrate delivery could not be lost completely until the processing all whose substrates of a fixed volume unit are predetermined was performed and discharged and it sent fixed volume unit conclusion ***** to the following process. Therefore, the substrate was processed continuously, it was small in equipment as much as possible, and the approach of lessening the time amount loss of substrate delivery was desired.

[0004] Therefore, the purpose of this invention is to solve the above-mentioned problem, and the tape-like substrate with which two or more circuit patterns are formed continuously is used. The above-mentioned tape-like substrate by mounting two or more electronic parts in delivery and the above-mentioned tape-like substrate intermittently The time amount loss of substrate delivery is lost and it is in offering the tape-like substrate used for the electronic-parts mounting approach to the tape-like substrate which can make mounting equipment size small, mounting equipment, and them.

[Translation done.]

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention is constituted as follows.

[0006] If this invention is caused like the 1st voice, the mounting approach of the electronic parts to the tape-like substrate characterized by to mount each above-mentioned electronic parts for the tape-like substrate with which two or more circuit patterns which can mount two or more electronic parts follow fixed spacing, and are formed intermittently on each above-mentioned circuit pattern of the above-mentioned tape-like substrate at the time of an intermittent delivery halt of delivery and the above-mentioned tape-like substrate will offer.

[0007] If this invention is caused like the 2nd voice, two or more electronic parts will be IC chip and a chip. Intermittently the tape-like substrate with which the circuit pattern which has each joint of the above-mentioned IC chip and the above-mentioned chip was formed in succession two or more Delivery, Previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate is given. The above-mentioned IC chip is mounted in the above-mentioned tape-like substrate with which the above-mentioned previous work business for IC chip mounting was given. Previous work business for chip component mounting for mounting the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip was mounted is given. While carrying out a reflow of the solder of the above-mentioned tape-like substrate with which the above-mentioned chip was mounted in the above-mentioned tape-like substrate with which the above-mentioned previous work business for chip component mounting was given, and solder was supplied, and the above-mentioned chip was mounted. In each above-mentioned routing from which it differs to the routing which carries out a reflow of the solder of the above-mentioned tape-like substrate with which the above-mentioned chip was mounted from the previous work business process for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate at the time of an intermittent delivery halt of the above-mentioned tape-like substrate on each above-mentioned circuit pattern with which the above-mentioned tape-like substrates differ, each above-mentioned routing is worked instantaneous -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 1st voice.

[0008] In the routing which mounts the above-mentioned IC chip in the above-mentioned tape-like substrate with which the above-mentioned previous work business for IC chip mounting was given if this invention is caused like the 3rd voice The above-mentioned IC chip with which the bump was formed in two or more electrodes of the above-mentioned IC chip Alignment is carried out so that each above-mentioned bump of the above-mentioned IC chip can join to two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. each bump of the above-mentioned IC chip is joined to each electrode on each circuit pattern of the above-mentioned tape-like substrate, and the above-mentioned IC chip is mounted in the above-mentioned tape-like substrate -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 2nd voice.

[0009] In the routing which will give the above-mentioned previous work business for IC chip mounting

for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate if this invention is caused like the 4th voice The above-mentioned IC chip with which the bump was formed in two or more electrodes of the above-mentioned IC chip is used as the cementing material which can join each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate with each above-mentioned bump of the above-mentioned IC chip. In the routing which mounts the above-mentioned IC chip in the above-mentioned tape-like substrate with which a non-conductive resin sheet or a non-conductive resin paste was supplied on each circuit pattern of a tape-like substrate, and the above-mentioned IC chip mounting previous work business was given The above-mentioned non-conductive resin sheet which is the above-mentioned cementing material supplied on each above-mentioned circuit pattern of the above-mentioned tape-like substrate, or a resin paste is minded. It pressurizes mounting the above-mentioned IC chip and heating the above-mentioned resin sheet or the above-mentioned resin paste. each above-mentioned bump of the above-mentioned IC chip is directly joined to each above-mentioned electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate, and junction is maintained when the above-mentioned resin sheet or the above-mentioned resin paste heat-hardens -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 2nd voice.

[0010] In the routing which will give the above-mentioned previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate if this invention is caused like the 5th voice The above-mentioned IC chip with which the bump was formed in two or more electrodes of the above-mentioned IC chip is used as the cementing material which can join each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate with each above-mentioned bump of the above-mentioned IC chip. The resin sheet with which the conductive particle was distributed, a resin paste, a conductive resin sheet, or a resin paste is supplied on each circuit pattern of a tape-like substrate. In the routing which mounts the above-mentioned IC chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip mounting previous work business was given The above-mentioned resin sheet with which the above-mentioned conductive particle which is the cementing material supplied on each above-mentioned circuit pattern of the above-mentioned tape-like substrate was distributed, the above-mentioned resin paste, the above-mentioned conductive resin sheet, or a resin paste is minded. It pressurizes mounting the above-mentioned IC chip and heating the above-mentioned resin sheet or the above-mentioned resin paste. Each above-mentioned bump of the above-mentioned IC chip to each above-mentioned electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate The above-mentioned conductive particle, or it joins indirectly through the resin sheet or resin paste of the above-mentioned conductivity, and junction is maintained when the above-mentioned resin sheet or the above-mentioned resin paste heat-hardens -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 2nd voice.

[0011] In the routing which will give the above-mentioned previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate if this invention is caused like the 6th voice The above-mentioned IC chip with which the bump was formed in two or more electrodes of the above-mentioned IC chip is used as the cementing material which can join each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate with each above-mentioned bump of the above-mentioned IC chip. In the routing which mounts the above-mentioned IC chip in the above-mentioned tape-like substrate with which the metal which is a conductive ingredient was supplied on each circuit pattern of a tape-like substrate, and the above-mentioned IC chip mounting previous work business was given The above-mentioned metal which is the cementing material supplied on each above-mentioned circuit pattern of the above-mentioned tape-like substrate is minded. Mount the above-mentioned IC chip, carry out heating fusion of the above-mentioned metal, and each above-mentioned bump of the above-mentioned IC chip is indirectly joined to each above-mentioned electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate through the above-mentioned metal. junction is maintained when the above-mentioned metal heat-hardens -- the mounting approach of the electronic parts to the tape-like substrate

of a publication is offered like the 2nd voice.

[0012] If this invention is caused like the 7th voice, two or more electronic parts will be IC chip and a chip. Intermittently the tape-like substrate with which the circuit pattern which has each joint of the above-mentioned IC chip and the above-mentioned chip was formed in succession two or more Delivery, Alignment is carried out so that two or more electrodes of the above-mentioned IC chip can join to two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. Metal diffusion junction according each electrode of the above-mentioned IC chip to a supersonic wave is given to each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. Previous work business for chip component mounting for mounting the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip was mounted in the above-mentioned tape-like substrate, and the above-mentioned IC chip was mounted is given. While carrying out a reflow of the solder of the above-mentioned tape-like substrate with which the above-mentioned chip was mounted in the above-mentioned tape-like substrate with which the above-mentioned previous work business for chip component mounting was given, and solder was supplied, and the above-mentioned chip was mounted In each above-mentioned routing from which it differs from the routing which mounts the above-mentioned IC chip at the above-mentioned tape-like substrate to the routing which carries out a reflow of the solder of the above-mentioned tape-like substrate with which the above-mentioned chip was mounted at the time of an intermittent delivery halt of the above-mentioned tape-like substrate on each above-mentioned circuit pattern with which the above-mentioned tape-like substrates differ, each above-mentioned routing is worked instantaneous -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 1st voice.

[0013] If this invention is caused like the 8th voice, two or more electronic parts will be IC chip and a chip. Intermittently the tape-like substrate with which the circuit pattern which has each joint of the above-mentioned IC chip and the above-mentioned chip was formed in succession two or more Delivery, Previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate is given. The above-mentioned IC chip is mounted in the above-mentioned tape-like substrate with which the above-mentioned previous work business for IC chip mounting was given. Previous work business for chip component mounting for mounting the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip was mounted is given. Alignment is carried out so that two or more electrodes of the above-mentioned chip can be joined to the above-mentioned tape-like substrate with which the above-mentioned previous work business for chip component mounting was given, and the cementing material was supplied at two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. While mounting the above-mentioned chip in the above-mentioned tape-like substrate with which each above-mentioned electrode of the above-mentioned chip was joined to each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate through the above-mentioned cementing material, and the above-mentioned IC chip was mounted In each above-mentioned routing from which it differs to the routing which mounts the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip was mounted from the previous work business process for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate at the time of an intermittent delivery halt of the above-mentioned tape-like substrate on each above-mentioned circuit pattern with which the above-mentioned tape-like substrates differ, each above-mentioned routing is worked instantaneous -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 1st voice.

[0014] If this invention is caused like the 9th voice, the above-mentioned cementing material will be conductive resin, and alignment will be carried out so that each above-mentioned electrode of the above-mentioned chip can be joined to two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. It pressurizes heating each above-mentioned electrode of the above-mentioned chip to each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. each above-mentioned electrode of the above-mentioned chip is indirectly

joined to each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate through the above-mentioned conductive resin, and junction is maintained when the above-mentioned conductive resin heat-hardens -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 8th voice.

[0015] If this invention is caused like the 10th voice, the above-mentioned cementing material will be a metal, and alignment will be carried out so that each above-mentioned electrode of the above-mentioned chip can be joined to two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate. Each above-mentioned electrode of the above-mentioned chip is mounted in each electrode on each above-mentioned circuit pattern of the above-mentioned tape-like substrate through the above-mentioned metal. Carry out heating fusion of the above-mentioned metal, and each above-mentioned electrode of the above-mentioned chip is indirectly joined to two or more electrodes on each above-mentioned circuit pattern of the above-mentioned tape-like substrate through the above-mentioned metal. junction is maintained when the above-mentioned metal heat-hardens -- it mounts -- the mounting approach of the electronic parts to the tape-like substrate of a publication is offered like the 8th voice.

[0016] The tape-like substrate supply activity section which can send intermittently the tape-like substrate with which two or more circuit patterns which can mount two or more electronic parts follow fixed spacing, and are formed if this invention is caused like the 11th voice. At the time of a halt of intermittent delivery of the above-mentioned tape-like substrate by the above-mentioned tape-like substrate supply activity section, on each above-mentioned circuit pattern of the above-mentioned tape-like substrate The electronic-parts mounting activity section which can mount each above-mentioned electronic parts, It has the tape-like substrate winding activity section which can roll round intermittently the above-mentioned tape-like substrate with which each above-mentioned electronic parts were mounted. And the above-mentioned tape-like substrate supply activity section and the above-mentioned tape-like substrate winding activity section offer the electronic-parts mounting equipment to the tape-like substrate characterized by it being possible to do supply and the rolling-up activity of the above-mentioned tape-like substrate instantaneous.

[0017] If this invention is caused like the 12th voice, two or more electronic parts will be IC chip and a chip. The tape-like substrate supply activity section which can send intermittently the tape-like substrate with which the circuit pattern which has each joint of the above-mentioned IC chip and the above-mentioned chip was formed in succession two or more, The above-mentioned IC chip and the above-mentioned chip The electronic-parts mounting activity section which can be mounted on each above-mentioned circuit pattern of the above-mentioned tape-like substrate, It has the tape-like substrate winding activity section which can roll round intermittently the above-mentioned tape-like substrate with which the above-mentioned IC chip and the above-mentioned chip were mounted. IC chip mounting previous work business section with the above-mentioned electronic-parts mounting activity section able to give previous work business for IC chip mounting for mounting the above-mentioned IC chip in the above-mentioned tape-like substrate, IC chip mounting activity section which can mount the above-mentioned IC chip in the above-mentioned tape-like substrate with which the above-mentioned previous work business for IC chip mounting was given, The chip component-mounting previous work business section which can give previous work business for chip component mounting for mounting the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned IC chip was mounted, The chip component-mounting activity section which can mount the above-mentioned chip in the above-mentioned tape-like substrate with which the above-mentioned previous work business for chip component mounting was given, and solder was supplied, It has the chip reflow activity section which carries out a reflow of the solder of the above-mentioned tape-like substrate with which the above-mentioned chip was mounted. Each above-mentioned activity section from which it differs from the above-mentioned IC chip mounting previous work business section to the above-mentioned chip reflow activity section at the time of a halt of intermittent delivery of the above-mentioned tape-like substrate by the above-mentioned tape-like substrate supply activity section It is possible to work each above-mentioned activity section instantaneous on each above-mentioned circuit

pattern with which the above-mentioned tape-like substrates differ. And the above-mentioned tape-like substrate supply activity section and the above-mentioned tape-like substrate winding activity section it is possible to do supply and the rolling-up activity of the above-mentioned tape-like substrate instantaneous -- the electronic-parts mounting equipment of the tape-like substrate of a publication is offered like the 11th voice.

[0018] If this invention is caused like the 13th voice, the above-mentioned tape-like substrate is twisted around a reel, and is possible. The above-mentioned tape-like substrate feed zone It has the reel feed zone which can send intermittently the above-mentioned tape-like substrate twisted around the above-mentioned reel by rewinding the above-mentioned reel. The above-mentioned tape-like substrate winding activity section the 11th mode equipped with the tape stowage which can be intermittently rolled round by rolling round the above-mentioned tape-like substrate with which each above-mentioned electronic parts were mounted to the above-mentioned reel -- or the electronic-parts mounting equipment to the tape-like substrate of a publication is offered like the 12th voice.

[0019] If this invention is caused like the 14th voice, the multiple of the spacing pitch in which each above-mentioned circuit pattern on the above-mentioned tape-like substrate is formed in spacing between each activity section of a before [from the above-mentioned IC chip mounting previous work business section / the above-mentioned chip reflow activity section] will be equipped with the data-control section in which adjustable is possible -- the electronic-parts mounting equipment to the tape-like substrate of a publication is offered like the 12th voice.

[0020] If this invention is caused like the 15th voice, the above-mentioned tape-like substrate winding activity section will be equipped with the tape stowage which can roll round intermittently the above-mentioned tape-like substrate protected with the letter spacer of embossing of the shape of a sheet which has the concave heights which can protect each above-mentioned electronic parts mounted in the above-mentioned tape-like substrate by rolling round to the above-mentioned reel -- the electronic-parts mounting equipment to the tape-like substrate of a publication offers like the 13th voice.

[0021] If this invention is caused like the 16th voice, it will have further the cooling section which can cool the above-mentioned tape-like substrate heated in the above-mentioned chip reflow activity section between the above-mentioned chip reflow activity section and the above-mentioned tape-like substrate winding activity section -- the electronic-parts mounting equipment to the tape-like substrate of a publication is offered like the 12th voice.

[0022]

[Embodiment of the Invention] Below, the gestalt of operation concerning this invention is explained at a detail based on a drawing.

[0023] Drawing 1 is the whole electronic-parts mounting equipment 101 top view using the electronic-parts mounting approach to the tape-like substrate concerning the 1st operation gestalt of this invention. In drawing 1, electronic-parts mounting equipment 101 long and slender in a longitudinal direction has two or more activity sections for mounting electronic parts, for example, IC chip, and a chip in a tape-like substrate on the top face along the direction of X which is a feed direction of a tape-like substrate, adjoining each other. These activity sections are roughly divided, are constituted by each seven activity sections, and are constituted by the tape-like substrate supply activity section 1, IC chip mounting previous work business section 2, IC chip mounting activity section 3, the chip component-mounting previous work business section 4, the chip component-mounting activity section 5, the chip reflow activity section 6, and the tape-like substrate winding activity section 7.

[0024] In the tape-like substrate supply activity section 1, a tape-like substrate is supplied to a tape-like substrate by rewinding and IC chip mounting previous work business section 2 from the reel around which the tape-like substrate formed so that it might continue that bottom two or more mutually-independent circuit patterns are also at fixed spacing on one tape currently formed with the insulating base is wound.

[0025] Next, the cementing material for joining IC chip to a tape-like substrate is supplied to IC chip joint on each circuit pattern of a tape-like substrate, and it is made to join IC chip to a tape-like substrate through a cementing material by thermocompression bonding in IC chip mounting activity section 3

after that in IC chip mounting previous work business section 2.

[0026] Next, in the chip component-mounting previous work business section 4, supply the solder for joining a chip to a tape-like substrate at the chip joint on a tape-like substrate, and it sets in the chip component-mounting activity section 5. A chip is attached in a tape-like substrate through solder, it heats in the chip reflow activity section 6, the solder currently supplied on the tape-like substrate is fused, a chip is joined to a tape-like substrate, and the tape-like substrate heated by the air blow etc. is cooled after that.

[0027] Finally, in the tape-like substrate winding activity section 7, the tape-like substrate with which IC chip and the chip were mounted in each circuit pattern is rolled round to a reel.

[0028] Moreover, a tape-like substrate is set in each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6. After adsorption immobilization is carried out on each stage, the activity of a law is performed everywhere, and after adsorption immobilization of a up to [each stage of a tape-like substrate] is canceled in all the activity sections, a tape-like substrate is sent to each following activity section from each activity section to which the activity of a law was performed everywhere.

[0029] In the side elevation of the tape-like substrate supply activity section 1 shown in drawing 2 (b) moreover, the tape-like substrate 11. By the tension roller 18 between the guide rollers 17a and 17b of the pair prepared along the direction of X which is a tape-like substrate feed direction of a between from the tape-like substrate supply activity section 1 to the tape-like substrate winding activity section 7 it is in the condition that fixed tension was always applied, and it is sent, without slackening from the tape-like substrate supply activity section 1 to the tape-like substrate fetch activity section 7.

[0030] The mounting approach of the electronic parts to the tape-like substrate using the electronic-parts mounting equipment 101 constituted by each activity section in each above process is explained below at a detail.

[0031] As shown in drawing 4, it is formed on the tape-like substrate 11 so that IC chip and the same circuit pattern 12 which can mount a chip may have the pitch P of fixed spacing and may continue. The distance of the die-length direction of the tape-like substrate 11 in the same location in each circuit pattern 12 between the same following circuit patterns 12 which follow one certain circuit pattern 12 is indicated to be a pitch P here. The tape-like substrate 11 is intermittently supplied to IC chip mounting previous work business section 2 which is the following activity section, rewinding the tape-like substrate 11 from a reel 15 by attaching in reel feed zone 1a in the tape-like substrate supply activity section 1 the reel 15 by which this tape-like substrate 11 is twisted, and carrying out intermittent rotation of this reel 15 using the motor 16 for tape-like substrate rewinding. In addition, in each activity section, a predetermined activity is done to each circuit pattern 12.

[0032] Next, after each circuit pattern 12 of the tape-like substrate 11 is sent from the tape-like substrate supply activity section to IC chip mounting previous work business section 2 of drawing 2 (a), in IC chip mounting previous work business section 2, adsorption maintenance of the tape-like substrate 11 which has each circuit pattern 12 is carried out by being drawn in in the adsorption hole of a stage 20 on a stage 20.

[0033] Next, as shown in drawing 5 (a), the cementing material 21 which be a non-conductive resin ingredient for join two or more electrode 13a of IC chip joint 13 of each circuit pattern 12 in the bump and the tape-like substrate 11 which be formed with conductor material, such as Au, on the electrode of the plurality of IC chip be formed in the shape of [from which both sides be protected by the protection film 22] a sheet. By supplying the cementing material 21 in the condition of having been wound around reel 23a, in the sheet material feed zone 23, and carrying out intermittent rotation of this reel 23a using motor 23b for sheet material rewinding, as shown in drawing 2 (a) As one side of the protection sheet 22 is removed with rewinding from reel 23a and a cementing material 21 is further shown in drawing 5 (b) After having been cut by cutting plane 21a by the piece of an individual, the upper part of each circuit pattern 12 of the tape-like substrate 11 is supplied by cutting section 23c so that IC chip joint 13 in each circuit pattern 12 of the tape-like substrate 11 can be supplied. Then, by being pressurized while a cementing material 21 is heated by heating / pressurization tool 24 to IC chip joint 13 of each circuit

pattern 12 in the tape-like substrate 11, as shown in drawing 5 (c) and (d), attachment supply is carried out and the protection sheet 22 which had protected another field of a cementing material 21 is attracted by the sheet suction section 27. Then, adsorption on the stage 20 of the tape-like substrate 11 is canceled.

[0034] Here, as shown in drawing 5 (e), when a cementing material 21 is the paste-like cementing material 25, it replaces with attachment of the above-mentioned cementing material 21, and spreading supply is carried out by the dispenser 26 to IC chip joint 13 of each circuit pattern 12 in the tape-like substrate 11.

[0035] Next, after each circuit pattern 12 of the tape-like substrate 11 was sent from IC chip mounting previous work business section 2 to IC chip mounting activity section 3a which is the 1st activity section in IC chip mounting activity section 3 of drawing 2 (a), In IC chip mounting activity section 3a, adsorption maintenance of the tape-like substrate 11 which has each circuit pattern 12 with which the cementing material 21 was stuck is carried out by being drawn in in the adsorption hole of stage 30a at stage 30a.

[0036] Next, as shown in drawing 6 (a), bump 31b is formed in two or more electrode 31a of the top face of the IC chip 31 of Au which is an electrical conducting material. In drawing 2 (a), the IC chip 31 is picked out from the components tray 32, the alignment array being carried out into the components tray 32, and the pars inflexa 33 moving above the components tray 32 by motor 33a for Y directional movements of built-in in the pars inflexa 33, and carrying out adsorption maintenance of the IC chip 31 by the adsorption nozzle of the pars inflexa 33, and the pars inflexa 33 returns to the original location, with the adsorption maintenance of the IC chip 31 carried out.

[0037] Next, so that the field in which each bump 31b of the IC chip 31 was formed may serve as facing down After reversing the IC chip 31 by motor 33b for reversal of the pars inflexa 33, While the pars inflexa 33 had carried out adsorption maintenance of the IC chip 31 by motor 33c for X directional movements of built-in in the pars inflexa 33, it moves under the tool 34, and as shown in drawing 6 (b), adsorption maintenance is carried out, and the IC tip 31 is received and passed to the pressurization and the heating unit of the inferior surface of tongue of a tool 34.

[0038] Then, while the pars inflexa 33 returns from the lower part of a tool 34 to the original location The IC chip 31 is moved to a tool 34 onto the tape-like substrate 11 by motor 34a for Y directional movements of a tool 34, while adsorption maintenance had been carried out. So that each bump 31b of the IC chip 31 and each electrode 13a of the IC joint 13 of each circuit pattern 12 in the tape-like substrate 11 can be joined After carrying out alignment of the IC chip 31 to each circuit pattern 12 in the tape-like substrate 11, as shown in drawing 6 (c) and (d) It is pressurized heating with a tool 34 and temporary sticking by pressure of the IC chip 31 is carried out at the cementing material 21 stuck on IC chip joint 13 of each circuit pattern 12 in the tape-like substrate 11. Then, a tool 34 is returned to the original location and the adsorption to stage 30a of the tape-like substrate 11 is canceled.

[0039] Next, after each circuit pattern 12 of the tape-like substrate 11 was sent from IC chip mounting activity section 3a to IC chip book sticking-by-pressure activity section 3b which is the 2nd activity section in IC chip mounting activity section 3 of drawing 2 (a), In IC chip book sticking-by-pressure activity section 3b, adsorption maintenance of the tape-like substrate 11 which has each circuit pattern 12 with which temporary sticking by pressure of the IC chip was carried out is carried out by being drawn in in the adsorption hole of stage 30b at stage 30b.

[0040] Next, as shown in drawing 7 (a), heating / pressurization tool 35 for carrying out actual sticking by pressure of the IC chip 31 by which temporary sticking by pressure was carried out is prevented from the dirt at the time of heating and pressurization with the protection sheet 36 in the inferior surface of tongue which is heating / pressurization side, and the always pure condition is maintained at the cementing material 21 supplied on the tape-like substrate 11.

[0041] By the motors 35a and 35b for XY directional movements of heating / pressurization tool 35 As heating / pressurization tool 35 is moved onto the tape-like substrate 11 and it is shown in drawing 7 (b) By being pressurized while the top face of the IC chip 31 by which temporary sticking by pressure was carried out is heated with heating / pressurization tool 35 by the cementing material 21 supplied on the

tape-like substrate 11. It is pushed away by the cementing material 21 between each bump 31b of the IC chip 31, and each electrode 13a of IC chip joint 13 of each circuit pattern 12 of the tape-like substrate 11. Each bump 31b of the IC chip 31 is directly joined to each electrode 13a of IC chip joint 13 of each circuit pattern 12 in the tape-like substrate 11. Then, a cementing material 21 will heat-harden and junction of the IC chip 31 and the tape-like substrate 11 will be maintained. Then, heating / pressurization tool 35 is returned to the original location, and the adsorption to stage 30b of the tape-like substrate 11 is canceled.

[0042] As it replaces with a non-conductive resin ingredient, and the metal which is the resin ingredient containing a conductive particle, a conductive resin ingredient, or a conductive ingredient may be used for a cementing material 21 here, for example, it is shown in drawing 7 (d). When a cementing material 21 is the anisotropy electric conduction film containing conductive particle 21a. When the top face of the IC chip 31 by which temporary sticking by pressure was carried out is pressurized by the cementing material 21 supplied on the tape-like substrate 11. The cementing material 21 between each bump 31b of the IC chip 31 and each electrode 13a of IC chip joint 13 of each circuit pattern 12 is pressurized, and conductive particle 21a in this part of a cementing material 21 is mixed. Each bump 31b of the IC chip 31 and each electrode 13a of IC chip joint 13 of each circuit pattern 12 of the tape-like substrate 11 are joined indirectly.

[0043] Moreover, each electrode 31a of the IC chip 31 and each electrode 13a of IC chip joint 13 of each circuit pattern 12 in the tape-like substrate 11. The ** which replaces with the junction approach by the above-mentioned cementing material 21, and does not use a cementing material 21. Metal diffusion junction by the supersonic wave may be given to each electrode 31a of the IC chip 31 and each electrode 13a of each circuit pattern 12 which were mutually formed with the metallic material, and the metal diffusion junction approach of mounting the IC chip 31 in the tape-like substrate 11 may be used.

[0044] Next, after each circuit pattern 12 of the tape-like substrate 11 is sent from IC chip mounting activity section 3 to the chip component-mounting previous work business section 4 of drawing 3, it sets to the solder feed zone 41 of the chip component-mounting previous work business section 4. As shown in drawing 8, adsorption maintenance of the tape-like substrate 11 which has each circuit pattern 12 with which the IC chip 31 was mounted is carried out by being drawn in by adsorption hole 42a of a stage 42 on a stage 42.

[0045] Drop the metal mask 43 on the tape-like substrate 11, and on each electrode 14a of two or more chip joints 14 of each circuit pattern 12 in the tape-like substrate 11. Next, two or more opening 43a for solder supply of the plate-like metal mask 43. From each opening 43a for solder supply a, alignment is carried out so that supply of the cream solder 44 may be possible on each electrode 14a of each chip joint 14, and the metal mask 43 is installed on the tape-like substrate 11.

[0046] Next, by making it move, while applying the tip of a squeegee 45 to the top face of the metal mask 43 by the motors 45a and 45b for XY directional movements and letting it slide, each opening 43a for solder supply is filled up with the cream solder 44, and printing supply of the cream solder 44 is carried out on electrode 14a of the chip joint 14 of each circuit pattern 12 in the tape-like substrate 11. Then, the metal mask 43 on the tape-like substrate 11 is moved up, and adsorption of a stage 42 is canceled.

[0047] Although the supply to each electrode 14a of two or more chip joints 14 of each circuit pattern 12 in the tape-like substrate 11 of the cream solder 44 does not carry out illustration, it may be replaced with the metal mask 43 and a squeegee 45 here, and spreading supply may be carried out by using a dispenser.

[0048] Moreover, the cream solder 44 may be an example of a cementing material 44, and may be the solder which replaces a cementing material 44 with the cream solder 44, and does not contain lead, metals, such as an alloy of Au and Sn, or conductive resin.

[0049] Next, in the chip component-mounting activity section 5, after each circuit pattern 12 of the tape-like substrate 11 is sent from the chip component-mounting previous work business section 4 to the chip component-mounting activity section 5 of drawing 3, as shown in drawing 9, adsorption maintenance of the tape-like substrate 11 which has each circuit pattern 12 with which the cream solder 44 was

printed is carried out by being drawn in by adsorption hole 55a of a stage 55 on a stage 55.

[0050] Next, a head 53 is moved in the XY direction by the motors 53a and 53b for XY directional movements of a head 53, a chip 51 is picked out from the parts cassette 52 to the parts cassette 52 by which two or more chips 51 which have two or more electrode 51a are stored, and it is made to move a chip 51 with a head 53 onto the tape-like substrate 11 in drawing 3 by carrying out adsorption maintenance of the chip 51 with the adsorption nozzle 54 of a head 53. Furthermore, as shown in drawing 9, each electrode 51a of a chip 51 is mounted through the cream solder 44 printed on each electrode 14a of each chip joint 14 of each circuit pattern 12 in the tape-like substrate 11. Then, a head 53 is returned to the original location and, as for the tape-like substrate 11, adsorption on a stage 55 is canceled.

[0051] Next, in the chip reflow activity section 6, after each circuit pattern 12 of the tape-like substrate 11 is sent from the chip component-mounting activity section 5 to the chip reflow activity section 6 of drawing 3, as shown in drawing 10, adsorption maintenance of the tape-like substrate 11 with which each chip 51 was mounted is carried out by being drawn in by adsorption hole 63a of a stage 63 on a stage 63.

[0052] Next, each electrode 51a of a chip 51 and each electrode 14a of each chip joint 14 of each circuit pattern 12 in the tape-like substrate 11 are joined by fusing the cream solder 44 printed by each electrode 14a of each chip joint 14 of each circuit pattern 12 with which each chip 51 was mounted, and which can be set tape-like substrate 11, and cooling and solidifying it using the heat source 61 of a light beam, a heater, etc. Then, adsorption on the stage 63 of the tape-like substrate 11 is canceled.

[0053] In order the heat from a heat source 61 is already in charge of the IC chip 31 mounted on each circuit pattern 12 in the tape-like substrate 11 at this time and not to reduce the junction quality of the IC chip 31 and the tape-like substrate 11 The whole top face of the IC chip 31 can be covered with the shield 62 formed so that it might be possible to cover the whole top face of the IC chip 31 joined on the circuit pattern 12, and the IC chip 31 can also be covered from the heat of a heat source 61.

[0054] Furthermore, opening section 63b is provided as a thermal break between the tape-like substrates 11 in the top face of a stage 63 so that the tape-like substrate 11 heated according to the heat source 61 cannot radiate heat easily.

[0055] Moreover, distortion of the tape-like substrate 11 grade by heat can be lessened by cooling the tape-like substrate 11 heated in the chip reflow activity section, and the mounted chip 51 by an air blow etc.

[0056] In the tape [after each circuit pattern 12 of the tape-like substrate 11 was finally sent from the chip reflow activity section 6 to the tape-like substrate winding activity section 7 of drawing 3]-like substrate winding activity section 7 It rolls round intermittently to a reel 71 by carrying out intermittent rotation of the reel 71 attached in tape stowage 7a in the tape-like substrate 11 cooled by the air blow etc. using the motor 72 for tape-like substrate winding where the IC chip 31 and a chip 51 are mounted.

[0057] When the tape-like substrate 11 with which the IC chip 31 and the chip 51 were mounted is rolled round by the reel 71 here, so that the IC chip 31 and a chip 51 may not contact the tape-like substrate 11 and directly After being crowded on both sides of the letter spacer 73 of embossing of the shape of a sheet which has the concave heights which can protect the IC chip 31 and a chip 51 and protecting each part article before the tape-like substrate 11 is rolled round as shown in drawing 1111, the tape-like substrate 11 is rolled round to a reel 71.

[0058] In addition, if in charge of mounting of a chip 51, you may mount by replacing with the mounting approach by the reflow of the solder in the above, and giving heating and pressurization like the mounting approach of the IC chip 31, using a conductive resin metallurgy group as a cementing material.

[0059] Moreover, in the tape-like substrate winding activity section 7, where the IC chip 31 and a chip 51 are mounted Where it replaced the tape-like substrate 11 with rolling round to a reel 71 and the IC chip 31 and a chip 51 are mounted You may be the case where it is taken out on a tray etc., using as each circuit board each circuit pattern 12 which pierced each circuit pattern 12 in the tape-like substrate 11 from the tape-like substrate 11, and was pierced according to the individual.

[0060] Next, the control network of the mounting equipment 101 for doing each of a series of activity in each above-mentioned activity section is explained. Drawing 12 is the control schematic diagram of mounting equipment 101. Motion control of the motor 16 for tape-like substrate rewinding and the motor 72 for winding is carried out by the mounting equipment Maine control section. Furthermore, each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6 has the sub control section for every activity section, and motion control of the non-control sections, such as each motor of each activity circles, is carried out by each of these sub control sections. Furthermore, also from the Maine control section, intensively, all of each of these sub control sections are associated so that supervisory control may be possible.

[0061] Moreover, in a mounting equipment Maine control section, motion control of the delivery of the tape-like substrate 11 is carried out, and it sets in each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6. If each predetermined activity in the activity section concerned is performed to each circuit pattern 12 of the tape-like substrate 11 and adsorption immobilization of a up to [each stage of the tape-like substrate 11] is canceled in each above-mentioned activity section The discharge signal of each activity section is sent to the Maine control section from each sub control section, and the Maine control section receives each discharge signal in all the above-mentioned activity sections from each sub control section. Then, a rotation actuating signal will be sent from the Maine control section to the motor 16 for tape-like substrate rewinding, and the motor 72 for winding, and when the motor 16 for tape-like substrate rewinding and the motor 72 for winding rotate, it will be sent that each circuit pattern 12 on the tape-like substrate 11 is also at a pitch P. Therefore, in each activity section, adsorption immobilization of the tape-like substrate 11 is carried out, and a predetermined activity in the activity section concerned is performed for one circuit pattern 12 on the tape-like substrate 11. After adsorption immobilization of the tape-like substrate 11 is canceled in all the activity sections, while it is sent to the following activity section that the circuit pattern 12 to which the activity in the activity section concerned was performed is also at a pitch P, the circuit pattern 12 with which the activity in the activity section concerned is not performed in each activity section is supplied.

[0062] Moreover, when the trouble which cannot perform discharge of the adsorption immobilization to up to each stage of the tape-like substrate 11 in each above-mentioned activity section occurs, from the sub control section of the activity section concerned, the discharge signal of adsorption immobilization will be send to the Maine control section, can make delivery of the tape-like substrate 11 a standby condition in the Maine control section, and can also emit a trouble alarm etc. to the Maine control section if needed.

[0063] Moreover, in each activity section, since it is necessary to recognize correctly each part article mounting position of each circuit pattern 12 formed succeeding the tape-like circuit board 11 top, it has the mounting position recognition section which recognizes the mounting position of each part article in each activity section by recognizing each part article mounting position of each circuit pattern 12 directly, or using the partial configuration of each circuit pattern 12, and recognizing the configuration.

[0064] Furthermore, when the defect circuit pattern is contained in the circuit pattern 12 in the tape-like substrate 11, it is possible to make the defect circuit pattern skip in each activity section based on the mapping data of each circuit pattern 12 in the tape-like substrate 11.

[0065] Moreover, it becomes possible by carrying out adjustable [of the spacing between each activity section of a before / the chip reflow activity section 6 / from IC chip mounting previous work business section 2] to the multiple of the pitch P of each circuit pattern 12 of the tape-like substrate 11 by data control to correspond to the configuration of various circuit patterns.

[0066] Next, in case the tape-like substrate 11 is processed with mounting equipment 101, the stop time t of intermittent delivery of the tape-like substrate 11 is explained. The time amount which each activity in each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6 takes IC chip mounting activity section 3a in IC chip mounting previous work business section 2t2 and IC chip mounting activity section 3 sets to t3a, and IC chip book sticking-by-pressure activity section 3b sets it as t3b, the chip component-mounting previous work business section 4t4, the

chip component-mounting activity section 5t5, and the chip reflow activity section 6t6. Then, it is necessary to carry out the stop time t of intermittent delivery of the tape-like substrate 11 to more than the maximum t_{\max} of the time amount $t2-t6$ which each activity in each activity section takes, and it will be determined by Maximum t_{\max} .

[0067] Moreover, it sets in IC chip book sticking-by-pressure activity section 3b or the chip reflow activity section 6. Since the heating time for mounting the IC chip 31 and a chip 51 in each circuit pattern 12 is needed, Time amount $t3b$ which each activity in IC chip book sticking-by-pressure activity section 3b or the chip reflow activity section 6 takes, or $t6$. Although it becomes the maximum t_{\max} of the time amount $t2-t6$ which each activity in each activity section takes in many cases, it sets in the chip component-mounting activity section 5, for example. When a large number [the chip 51 mounted] The time amount $t5$ which the activity in the chip component-mounting activity section 5 takes becomes larger than time amount $t3b$ which each activity kicked in IC chip book sticking-by-pressure activity section 3b and the chip reflow activity section 6 takes, and $t6$. There is a case so that it may become the maximum t_{\max} of the time amount $t2-t6$ which each activity in each activity section takes. In such a case, it sets in the activity section applicable to the maximum t_{\max} of the time amount $t2-t6$ which each activity in each activity section takes. The time amount which the activity concerned in the activity section concerned takes by dividing a routing into two division etc. is divided similarly. Becoming small, the maximum $t_{\max1}$ of the time amount $t2-t6$ which each activity in each activity section after routing division takes serves as working hours used as the max of the time amount which each activity in each activity section takes also including the time amount which the activity in the activity section concerned after the routing was divided takes. Therefore, maximum $t_{\max1}$ can be made smaller than Maximum t_{\max} , and can shorten the stop time t of intermittent delivery of the tape-like substrate 11.

[0068] Moreover, electronic-parts mounting equipment 101 mounts the chip 51, after being constituted in order of each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6 and mounting the IC chip 31, but after a chip 51 is mounted, it may constitute each activity section so that the IC chip 31 may be mounted.

[0069] In addition, in this operation gestalt, although the mounting approach of the electronic parts to the tape-like substrate 11 with which the same circuit pattern 12 is continuously formed with the fixed spacing pitch P was explained, as long as the circuit pattern 12 is continuously formed in the tape-like substrate 11 with the fixed spacing pitch P , each circuit pattern 12 may not be the same and may be somewhat different.

[0070] According to the operation gestalt of the above 1st, the following effectiveness can be acquired.

[0071] Conventionally, the buffer section of a substrate was prepared for every activity section in mounting equipment, and the substrate which packed the substrate processed in each activity section by the fixed volume unit, and was processed after the substrate of a fixed volume unit collected on each buffer section in delivery and each buffer section was sent to the following activity section. However, the tape-like substrate 11 formed so that the same circuit pattern 12 might continue with the pitch P of fixed spacing is used. Supply this tape-like substrate 11 to each activity section of mounting equipment 101, and a predetermined activity is performed to the tape-like substrate 11 in each activity section. By rolling round the tape-like substrate 11 with which the activity was performed, synchronizing supply and the winding activity of the tape-like substrate 11, and performing them intermittently [of a parenthesis] In each activity section which adjoins mutually [from supply of the tape-like substrate 11 before rolling up], it will let the one tape-like substrate 11 pass, and the tape-like substrate 11 will be sent intermittently.

[0072] Furthermore, whenever an activity predetermined in one circuit pattern 12 on the tape-like substrate 11 with each activity section is performed by sending the one tape-like substrate 11 to each activity section which adjoins mutually intermittently, it is sent to the following activity section that the circuit pattern 12 which worked is also at a pitch P . The circuit pattern 12 with which the activity in the activity section concerned is not performed in each activity section with it will be supplied. Therefore, in each activity section, since each predetermined activity will be repeated intermittently, the buffer section of a substrate becomes unnecessary and it becomes possible to make size of mounting equipment small.

[0073] Moreover, it sets to the mounting equipment of the conventional electronic parts of a case so that substrate delivery may be started to mounting equipment. Until it is discharged from each activity section and fixed volume unit conclusion ***** is sent to the following activity section in each activity section in mounting equipment, after the mounting activity of electronic parts is performed to all the substrates of a fixed volume unit In the following activity section, it is in the state waiting for processing of a substrate, and there was a time amount loss of substrate delivery. However, whenever it supplies this tape-like substrate 11 to mounting equipment 101 and an activity predetermined in one circuit pattern 12 with each activity section is performed using the tape-like substrate 11 formed so that the same circuit pattern 12 might continue, it is sent to the following activity section that the circuit pattern 12 with which the activity was performed is also at a pitch P. The circuit pattern 12 with which the activity in the activity section concerned is not performed in each activity section with it will be supplied. Therefore, in each activity section, repeatedly, each predetermined activity can be performed to a substrate, the time amount loss of substrate delivery can be shortened, and it becomes possible intermittently to aim at reduction of mounting cost. Furthermore, an operating ratio can be gathered in each activity section, and it becomes possible to raise productivity.

[0074] Moreover, in the mounting approach of the electronic parts using the substrate of the conventional piece of an individual, since the predetermined activity in delivery and the activity section concerned was performed for the substrate of the piece of an individual to each activity section, the substrate was discharged from the activity section concerned and it was carrying out by repeating these activities, it was difficult to fixed-ize the delivery location of the substrate of the piece of each in each activity section. However, by being formed so that the circuit pattern 12 may continue with the fixed spacing pitch P on the tape-like substrate 11 Beforehand each circuit pattern 12 by being positioned on the tape-like substrate 11 and sending that it is also at a pitch P about the one tape-like substrate 11 Since the delivery location of each circuit pattern 12 can be fixed-ized more in each activity section, it becomes possible to raise working efficiency.

[0075] Moreover, mounting equipment 101 is equipped with the mounting equipment Maine control section which carries out motion control of the motor 16 for tape-like substrate rewinding, and the motor 72 for winding, and the sub control section which carries out motion control of the non-control sections, such as each motor of each activity circles, for each [from IC chip mounting previous work business section 2 to the chip reflow activity section 6] activity section of every, and also from the Maine control section, intensively, all of each of these sub control sections are associated so that supervisory control may be possible. This sets in each activity section from IC chip mounting previous work business section 2 to the chip reflow activity section 6. If each predetermined activity in the activity section concerned is performed to each circuit pattern 12 of the tape-like substrate 11 and adsorption immobilization of a up to [each stage of the tape-like substrate 11] is canceled in each above-mentioned activity section after adsorption immobilization of the tape-like substrate is carried out The discharge signal of each activity section will be sent to the Maine control section from each sub control section, and the Maine control section will receive the discharge signal in all the above-mentioned activity sections from each sub control section. Then, a rotation actuating signal will be sent from the Maine control section to the motor 16 for tape-like substrate rewinding, and the motor 72 for winding, and when the motor 16 for tape-like substrate rewinding and the motor 72 for winding rotate, it will be sent that each circuit pattern 12 on the tape-like substrate 11 is also at a pitch P. Therefore, in each activity section, adsorption immobilization of the tape-like substrate 11 is carried out, and a predetermined activity in the activity section concerned is performed to one circuit pattern 12 on the tape-like substrate 11. After adsorption immobilization of the tape-like substrate 11 is canceled in all the activity sections, while it is sent to the following activity section that the circuit pattern 12 to which the activity in the activity section concerned was performed is also at a pitch P The circuit pattern 12 with which the activity in the activity section concerned is not performed in each activity section will be supplied, and the motion control of intermittent delivery of the tape-like substrate 11 becomes possible.

[0076]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the whole mounting equipment top view of the electronic parts to the tape-like substrate concerning the 1st operation gestalt of this invention.

[Drawing 2] The partial expansion top view of the mounting equipment of the electronic parts to a tape-like substrate [in / in (a) / drawing 1] and (b) are the side elevations of the tape-like substrate supply activity section.

[Drawing 3] It is the partial expansion top view of the mounting equipment of the electronic parts to the tape-like substrate in drawing 1 .

[Drawing 4] It is the part plan of the tape-like substrate used for the mounting approach of the electronic parts to the tape-like substrate concerning the 1st operation gestalt of this invention.

[Drawing 5] It is drawing showing the activity approach in IC chip mounting previous work business section of the mounting approach of the electronic parts to the tape-like substrate concerning the 1st operation gestalt of this invention. (a) and (b) are a sectional view in the condition that, as for the sectional view of a cementing material, and (c), the cementing material was stuck on the sectional view of heating / pressurization tool, a cementing material, and a tape-like substrate, and (d) was stuck on the tape-like substrate, and a perspective view in the condition that (e) is carrying out spreading supply of the paste-like cementing material at the tape-like substrate.

[Drawing 6] It is drawing showing the activity approach in IC chip mounting activity section of the mounting approach of the electronic parts to the tape-like substrate concerning the 1st operation gestalt of this invention, and, as for the sectional view in the condition that temporary sticking by pressure of the IC chip is carried out by heating / pressurization tool at a tape-like substrate, and (d), the sectional view of IC chip, (b), and (c) of (a) are [IC chips] the sectional views in the condition that temporary sticking by pressure was carried out at the tape-like substrate.

[Drawing 7] It is drawing showing the activity approach in IC chip book sticking-by-pressure activity section of the mounting approach of the electronic parts to the tape-like substrate concerning the 1st operation gestalt of this invention. The sectional view in the condition that, as for (a), IC chip is carried out in the sectional view of heating / pressurization tool, and actual sticking by pressure of the (b) is carried out by heating / pressurization tool at a tape-like substrate, The sectional view in the condition that actual sticking by pressure of the IC chip was carried out at the tape-like substrate, and (d) of (c) are the sectional views in the condition that actual sticking by pressure of the IC chip at the time of using the anisotropy electric conduction film for a cementing material was carried out at the tape-like substrate.

[Drawing 8] It is drawing showing the activity approach in the chip component-mounting previous work business section of the mounting approach of the electronic parts to the tape-like substrate concerning the 1st operation gestalt of this invention, and is a sectional view in the condition that cream solder is supplied on a tape-like substrate.

[Drawing 9] It is drawing showing the activity approach in the chip component-mounting activity section of the mounting approach of the electronic parts to the tape-like substrate concerning the 1st

operation gestalt of this invention, and is a sectional view in the condition that the chip was mounted on the tape-like substrate.

[Drawing 10] It is drawing showing the activity approach in the chip reflow activity section of the mounting approach of the electronic parts to the tape-like substrate concerning the 1st operation gestalt of this invention, and is a sectional view in the condition of having carried out a reflow of the solder to the shape of a tape-like substrate, and having joined the chip.

[Drawing 11] It is a sectional view in the condition of having protected the tape-like substrate with which the electronic parts in the mounting approach of the electronic parts to the tape-like substrate concerning the 1st operation gestalt of this invention were mounted with the letter spacer of embossing.

[Drawing 12] It is a control schematic diagram in the electronic-parts mounting equipment to the tape-like substrate concerning the 1st operation gestalt of this invention.

[Description of Notations]

1 -- The tape-like substrate supply activity section, 1a -- A reel feed zone, 2 -- IC chip mounting previous work business section, 3 -- IC chip mounting activity section, 3 a--IC chip mounting activity section, 3 b--IC chip book sticking-by-pressure activity section, 4 -- The chip component-mounting previous work business section, 5 -- The chip component-mounting activity section, 6 -- Chip reflow activity section, 7 -- The tape-like substrate winding activity section, 7a -- A tape stowage, 11 -- Tape-like substrate, 12 -- A circuit pattern, 13 -- The electrode of IC chip joint and 13 a--IC chip joint, 14 -- A chip joint, 14a -- The electrode of a chip joint, 15 -- Reel, 16 -- The motor for tape-like substrate rewinding, 17a -- A guide roller, 17b -- Guide roller, 18 [-- A conductive particle,] -- A tension roller, 20 -- A stage, 21 -- A cementing material, 21a 22 [-- The motor for sheet material rewinding,] -- A protection sheet, 23 -- A sheet material feed zone, 23a -- A reel, 23b 23c -- The cutting section, 24 -- Heating / pressurization tool, 25 -- Paste-like cementing material, 26 [-- Stage,] -- A dispenser, 27 -- The suction section, 30a -- A stage, 30b 31 -- The electrode of IC chip and 31 a--IC chip, 31b -- A bump, 32 -- Components tray, 33 -- The pars inflexa, 33a -- The motor for Y directional movements of the pars inflexa, 33b -- The motor for reversal of the pars inflexa, 33c -- The motor for X directional movements of the pars inflexa, 34 -- A tool, 34a -- The motor for Y directional movements of a tool, 35 -- Heating / pressurization tool, 35a -- The motor for X directional movements of heating / pressurization tool, 35b -- The motor for Y directional movements of heating / pressurization tool, 36 -- Protection sheet, 41 [-- Metal mask,] -- A solder feed zone, 42 -- A stage, 42a -- An adsorption hole, 43 43a -- Opening for solder supply, 44 -- Cream solder, 45 -- Squeegee, 45a -- The motor for X directional movements of a squeegee, 45b -- The motor for Y directional movements of a squeegee, 51 -- A chip, 51a -- The electrode of a chip, 52 -- Parts cassette, 53 [-- Adsorption hole,] -- A head, 54 -- An adsorption nozzle, 55 -- A stage, 55a 61 [-- An adsorption hole, 63b / -- Opening section,] -- A heat source, 62 -- A shield, 63 -- A stage, 63a 71 -- A reel, 72 -- The motor for tape-like substrate winding, 73 -- Letter spacer of embossing, 101 -- Electronic-parts mounting equipment, P -- A pitch, t -- The stop time of intermittent delivery of a tape-like substrate, t2 -- Time amount which the activity of IC chip mounting previous work business section takes, time amount which the activity of the t3 a--IC chip mounting activity section takes, The time amount, t4 which the activity of the t3 b--IC chip book sticking-by-pressure activity section takes -- Time amount which the activity of the chip component-mounting previous work business section takes, t5 [-- Maximum of the time amount which each activity of each activity section after routing division takes.] -- The time amount, t6 which the activity of the chip component-mounting activity section takes -- Time amount, tmax which the activity of the chip reflow activity section takes -- The maximum of the time amount which each activity of each activity section takes, tmax]

[Translation done.]

* NOTICES *

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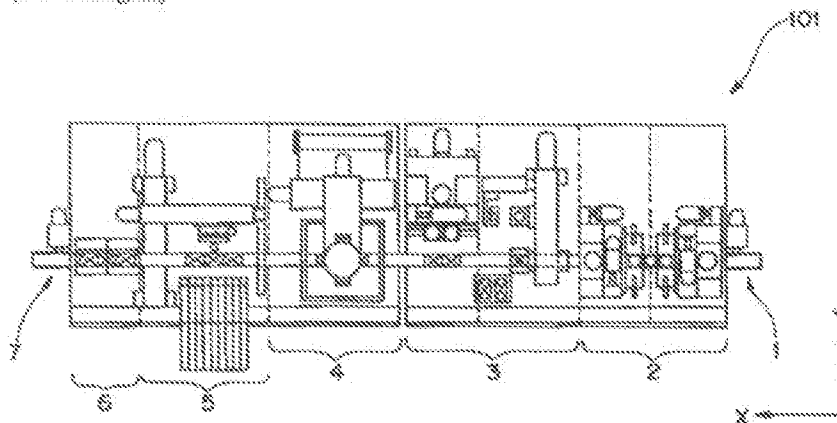
1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. **** shows the word which can not be translated.

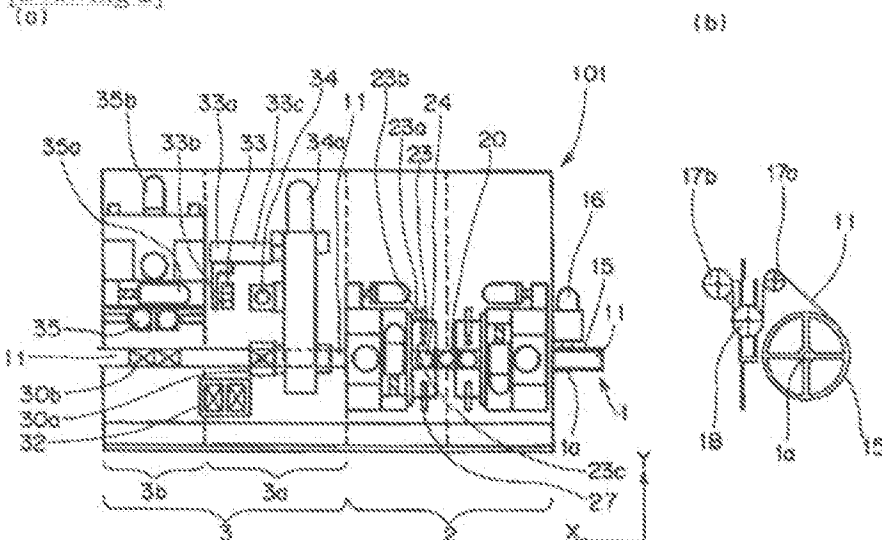
3. In the drawings, any words are not translated.

DRAWINGS

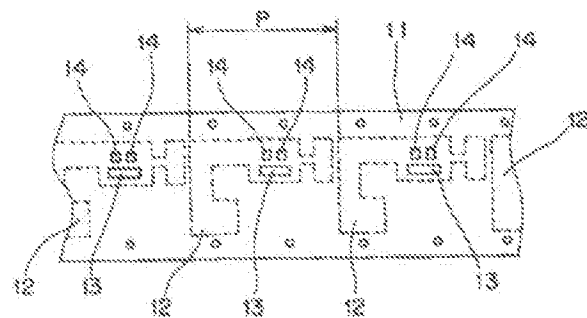
[Drawing 1]



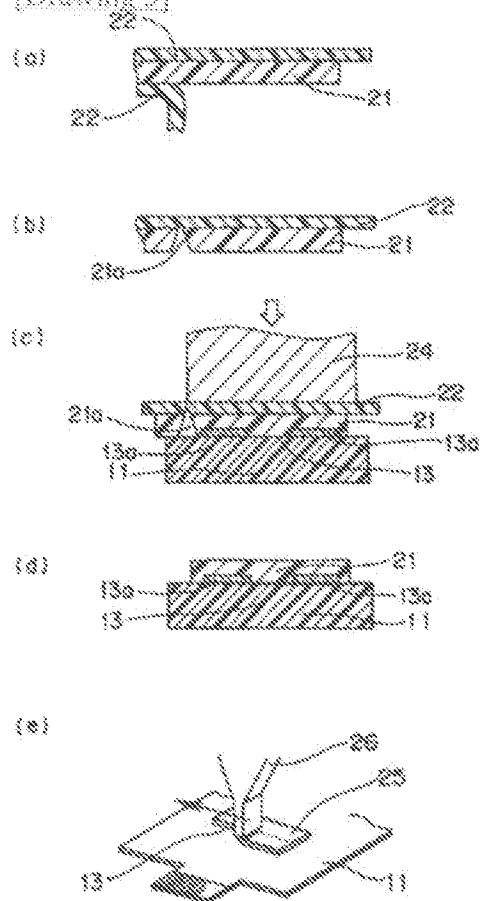
[Drawing 2]



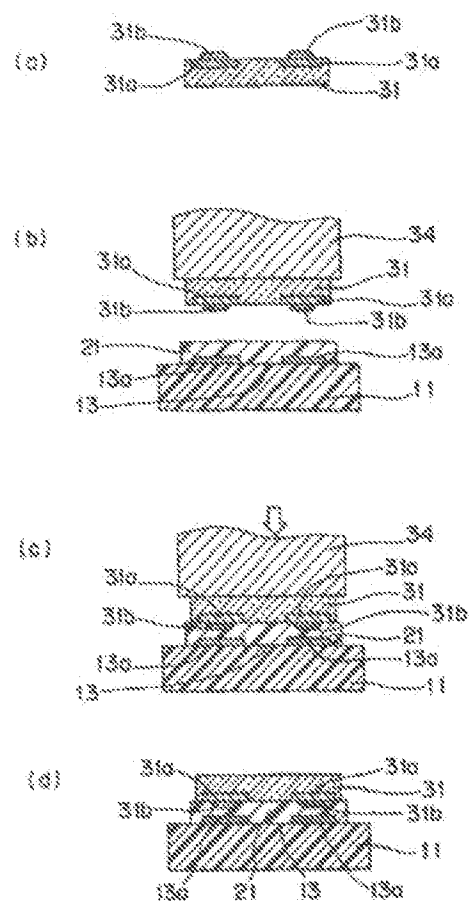
[Drawing 3]



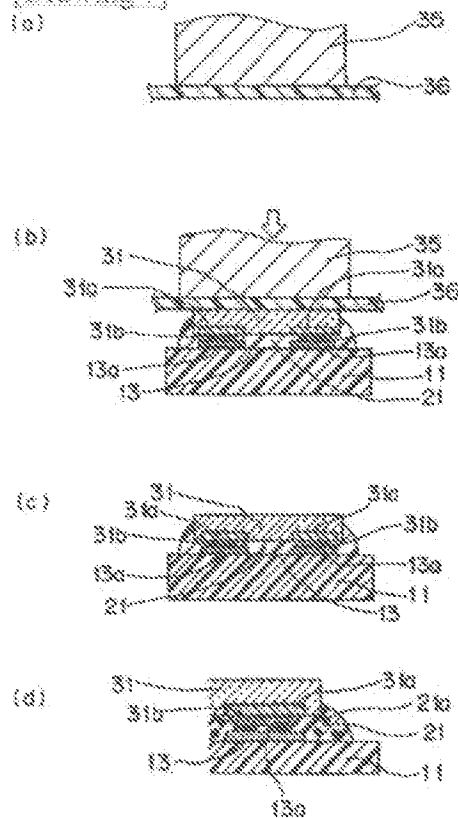
[Drawing 5]



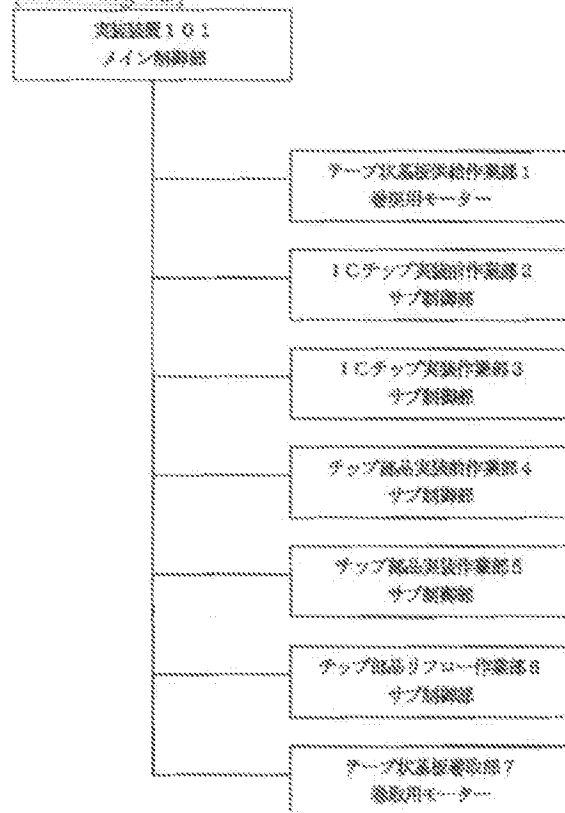
[Drawing 6]



[Drawing 7]



[Drawing 12]



[Translation done.]